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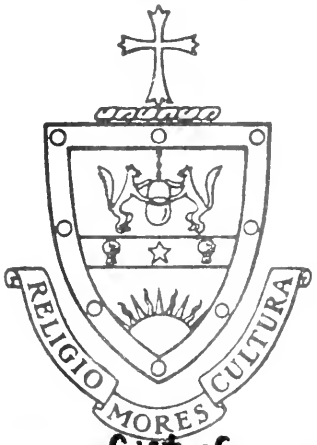

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REPORTS

OF THE

INSPECTORS OF MINES

OF THE

ANTHRACITE COAL REGIONS OF PENNSYLVANIA,

FOR THE

YEAR 1881.

HARRISBURG.
LANE S. HART, STATE PRINTER.
1882.

VIRTUE
LIBERTY AND
INDEPENDENCE

REPORTS

OF THE

INSPECTORS OF MINES

OF THE

ANTHRACITE COAL REGIONS OF PENNSYLVANIA,

FOR THE YEAR 1881.

POTTSVILLE, SCHUYLKILL COUNTY, *April 3, 1882.*

To His Excellency HENRY M. HOYT,

Governor of Pennsylvania:

SIR: In obedience to the provisions of the second section of the act of 2d day of June, A. D. 1871, I have the honor of herewith submitting the following report of the office of clerk of the mining district of Schuylkill, comprising the counties of Schuylkill, Northumberland, Dauphin, and Columbia, for the year ending 31st December, 1881; together with summary of production of coal, number of employés, fatal and non-fatal casualties, which are given in detail in the respective reports of the inspectors, hereto attached.

The monthly reports to the court have been made regularly throughout the year, and are becoming more accurate and reliable, although not as satisfactory as we would desire to have them, yet hope that all engaged in mining and shipping of coal will assist by their prompt return of the tonnage blank that is monthly sent out to each operator.

We tender our thanks to the coal companies and operators, who have, by their prompt returns of monthly tonnage, number of employés, and other favors extended, materially aided us in the proper discharge of our duties.

and earnestly hope that nothing may ever occur to mar the present pleasant relations existing between the clerk of the mining district and the producers of coal.

Total amount coal shipped to market, Pottsville division,	1,726,089.12	
Consumed or sold at colliery,	103,566.14	
Total production,		1,829,656.06
Total amount shipped to market, Shenandoah division,	4,249,643.08	
Consumed or sold at colliery,	254,980.18	
Total production,		4,504,624.06
Total amount of coal shipped to market, Shamokin division,	4,181,696.17	
Consumed or sold at colliery,	250,904.16	
Total production,		4,432,601.13
Total production of Schuylkill district,		10,766,882.05
Increase for 1881,		2,090,653.16
Total number employés, Pottsville division,		6,497
Total number employés, Shenandoah division,		10,911
Total number employés, Shamokin division,		11,865
Total number employés, entire district,		29,273
Decrease for 1881,		727
Average number of days worked by breaker, Pottsville division,		$202\frac{1}{2}$
Average number of days worked by breaker, Shenandoah division,		$215\frac{10}{23}$
Average number of days worked by breaker, Shamokin division,		$217\frac{11}{16}$
Average number of days worked in entire district,		$212\frac{1}{3}$

Total fatal casualties, Pottsville division,		18
Total non-fatal casualties, Pottsville divison,	173	
Total fatal casualties, Shenandoah division,		34
Total non-fatal casualties, Shenandoah division,	149	
Total fatal casualties, Shamokin division,		48
Total non-fatal casualties, Shamokin division,	147	
Totals,	469	100
Total fatal and non-fatal,		569

Ratio of tons per life lost,	107,668.16
Ratio of tons per person injured,	22,957.02
Ratio of employés to each life lost,	292.7
Ratio of employés to each person injured,	62.4

The expenses for the year 1881, for salary of clerk, rent of office, light, fixtures, postage, and incidental expenses, and for which vouchers were returned to the Auditor General's office, amounted to $1,972.

Very respectfully, &c.,

EDWARD J. GAYNOR,

Clerk Mining District of Schuylkill.

FIRST DISTRICT.

Office of Inspector of Mines,
Pottsville, Pa., *March, 1882.*

To His Excellency Henry M. Hoyt,
Governor of Pennsylvania:

Sir: In accordance with the general act of the Assembly, passed March 3, 1870, I have the honor of submitting to you my annual report, as Inspector of Coal Mines for the First Schuylkill District, for the year ending December 31, 1881.

It is with extreme regret that I am compelled to report eighteen fatal accidents, resulting in the same number of deaths, which is an increase of three above that of the previous year, arising from the following causes, viz:

Explosions of fire damp,	2
Falls of coal and roof,	5
Crushed by mine cars,	5
Machinery on surface,	2
Breaking of ropes,	1
Falling off a cage down the shaft,	1
Miscellaneous,	2
Total number of deaths,	18

I have endeavored to point out, elsewhere in the detailed statements bearing on the foregoing casualties, the cause of such serious loss of life, hoping that past events may serve as a warning to those in charge of the collieries, and be the means of preventing a repetition of similar occurrences in the future.

Non-Fatal Casualties.

One hundred and seventy-four persons were injured through various causes. In many cases the injuries received were of a severe character, but a majority were but slight. This will be seen by referring to the list of non-fatal accidents.

Coal Production.

As before stated, the report shows an increase in the loss of life for 1881; not, however, without a greater increase in the proportion of coal mined, which the following table shows:

Table for 1881.

Amount of coal sent to market, in tons,	1,726,089
Amount of coal sold and consumed at mines,	103,566
Total output for 1881,	1,829,656

Table for 1880.

Amount of coal sent to market in 1880,	1,367,531
Amount of coal sold and consumed at mines,	93,509
Total output for 1880,	1,461,040
Total output for 1881,	1,829,656
Total output for 1880,	1,461,040
Difference,	368,606
Number of persons employed,	6,497
Ratio of tons per life lost,	101,647
Ratio of tons per person injured,	10,516
Ratio of employés to each life lost,	356.5
Ratio of employés to each person injured,	$37\frac{173}{996}$
Tons of coal produced per each employé,	281.5

Condition of Collieries.

The condition of the collieries in this district are generally satisfactory, so far as the requirements of the general mine law is concerned; still, in some instances, there is room for improvements. The latter may be appropriately applied to the law itself, as well as to the working of collieries; in fact, it is to this source we must look, if we want to reduce the present accident list to anything like reasonable proportions with our output of coal. It is very true, that since the mine act came into force, many of the evils that existed before its passage have been removed. But since that time much has been learned from experience, our mines having increased in depth, and the producing capacity doubled, and many unforeseen dangers and difficulties having arisen, requiring many reformations in the present law that could not be provided against at the time of its enactment, even if its framers and supporters had foreseen all the necessary wants of the present time. In fact, what they did they did well, considering that the whole anthracite interest was in operation against them and the passage of such an act. However, the law was passed; but if we are to do better in the future, our present law must be revised, and I question whether the revision would meet with the same antagonism as in the passage of the first law, providing it is done with the proper spirit, and for the best interests of the two parties—the workmen and employers—and all aiming at the one desired and important point, viz: saving of life and limb.

In order to accomplish this end, we would suggest that a committee be

appointed; the said committee to be composed of miners or their representatives, with the same number of operators, also mine inspectors, say six of each interest. If the committee thought proper, they could call in one or more attorneys, in order that the new version might be put into proper shape. With such a team of men, it is our opinion, all of them being interested in the matter, could arrive at some definite conclusion without the loss of a great deal of time to either party. In the meanwhile, give us a practicable code of general laws, also the groundwork for the establishment of a code of special rules for the government of the employés in and about our mines. The necessity of the latter is at once made apparent by examining the accident lists accompanying these reports, which state of affairs must continue until relief comes from the source above referred to.

No sane person would think of risking his life in making a voyage across the Atlantic ocean, although he might be on board of one of the magnificent ocean steamers, neither would he have any desire of making a trip across our continent in one of the express trains, when he was acquainted with the fact that every man in the employment of either of these companies was left to make rules and regulations to suit himself. Yet such is the system of government in and about our collieries, and seventy thousand human beings are daily employed at them, under no less dangerous circumstances. Therefore, it is not at all surprising that the list of casualties make such a deplorable showing in these annual reports, one year after another.

Very respectfully, &c.,

SAMUEL GAY,

Inspector of Mines.

Prosecutions.

Two complaints were entered and tried during the year, in the court of quarter sessions of Schuylkill county for violation of the act of 1870.

The first was refusal to comply with the amendment to section eleven of said act, which required that whenever ten men had arrived at the bottom of the slope or shaft, they should be furnished with cage or wagon to ride up to the surface.

Chas. Murray, inside foreman of Philadelphia and Reading Coal and Iron Company's Eagle Hill colliery refused to comply with the above-cited amendment, upon the grounds that he had received instructions from his superior officers to act to the contrary.

Upon consulation with the counsel for mine inspectors of Schuylkill district, G. R. Kaercher, Esq., it was determined to make this a test case, and that the inside foreman, although not willfully disobeying the law, was the proper person to prosecute.

In the trial of the case the defendent was ably defended by the Compa-

ny's attorney, Hon. James Ellis, Mr. Kaercher acting for the Commonwealth.

The charge of the Court (Hon. O. P. Bechtel on the bench) to the jury gave general satisfacton to both parties, and the jury after very short deliberation returned a verdict of "Guilty." The defendents paid all costs and gave assurance that the law would be complied with in the future. No further penalty was required as it was not the purpose to punish Mr. Murray for obeying the instructions of his superiors, but rather to show the latter that they must obey the law, notwithstanding their positions as officers of a powerful corporation.

The second case was brought against Philip Brenzil, inside foreman of the Black Mine colliery for violation of the nineteenth section of the act of 1870, by riding up the slope on loaded wagons.

This complaint was made upon information received through the mail, and from investigation made into the matter, at the colliery. Several witnesses stated that Mr. Brenzil was in the habit of riding up the slope on loaded cars, and when requested not to do so by those in charge of the bottom of the slope, replied in violent and unbecoming language.

This fact was fully proven during the trial of the case, also that the ropes were unsafe. Yet the jury saw proper to be lenient towards the defendent and returned a verdict of "Not guilty, but pay all costs," which we deemed a sufficient punishment to deter all others from committing the same offense.

Danger of Wooden Structures over the Mouths of Slopes or Shafts.

This is another serious matter that forcibly presents itself in connection with mine fires. After giving the subject our fullest consideration, we have come to the conclusion that the question is of such vital importance to our mining community that we consider it part of our duty to call your Excellency's attention to some of the facts in connection therewith as they present themselves. It is true that we have already had legislation in this direction, which was supposed to cover sufficient grounds to protect those employed underground against another Avondale disaster, in which one hundred and twenty lives were lost. This supposed safeguard is contained or provided for in the third section of what is known as the mine law of 1870, under which act it becomes compulsory on all mine owners operating in the anthracite coal fields to provide two available openings for the passage of persons in and out of mines which are operated by shafts or slopes, and to be separated by not less than one hundred and fifty feet of natural strata. The question now arises: With this section of the law in force and fully complied with, are the lives of those engaged in many of our extensive collieries as reasonably safe as they should be, or as the framers of the act of 1870 supposed they would be? In answer to this we do not hesitate to say that they are not, and that the second outlet does not afford the desired security intended, where large wooden structures are erected over the mouths of shafts and slopes, many of which contain several hundred thou-

sand lineal feet of lumber. In order that the subject may be clearly presented, we will suppose that a fire occurs in one of these large concerns, many portions of which are saturated with oil from different parts of the machinery, converting the whole into one great mass of prepared kindling wood, requiring but a few moments, in case a fire should break out, to infumes the whole building, thus preventing the use of their main hoisting shaft or slope as a place of egress, hence the only means for those in the mine to make their escape is that afforded by the second outlet which generally forms the return air-course or upcast. A very important question arises at this critical point: Would it be possible for them to make their escape through the outlet or supposed safety road before the smoke and flames, which would naturally find their way into the downcast, would become so dense as to suffocate them before the place of safety could be reached? We will, furthermore, assume that the colliery officials have taken precautionary measures in adopting an efficient code of rules and signals in order that the ventilating fan may be stopped at once, also by which means the men in charge of the bottom of the shaft can be notified of the danger, and those employed in the extreme portions of the mine, be warned to make their escape.

These regulations would be very effective in a mine that does not give off large volumes of fire-damp, providing the second outlet or upcast was not so located that the temperature inside of the mine would naturally cause this opening to retain the return current. If such should be the case, then it is doubtful whether they could escape, unless provisions had been made to cut off the communication between the upcast and downcast. On the other hand, supposing the mine to be a fiery one, it is a well known fact that a majority of them are of this character. Under such circumstances, what would be the result of stopping the ventilating machinery where it often requires from one to two hundred thousand cubic feet of air per minute, kept in constant circulation to dilute and carry off the explosive mixtures as rapidly as they are generated? The question once more presents itself: Would those employed in a mine of this character have time to make their escape before they would be overtaken by an explosion, or rendered helpless, in consequence of the whole mine becoming charged with inflammable and other noxious gases. After much thought on this subject I have come to the conclusion that where these buildings are placed over the mouths of shafts or slopes, or in close proximity thereto, which, as a general rule, forms the intake by which the mines are supplied with fresh currents of air, that the lives of those employed in such collieries are not as safe as the framers of our present mine law had contemplated when it was passed in 1870; and I fear that unless some steps are taken by our State Legislators to remedy the evils referred to, we shall be compelled to witness another mine horror similar to that at Avondale.

In this district at present there are in operation but two of these "man-traps," in which we would anticipate any such consequence as above-cited,

having breakers built partially over the mouths of the shafts. They are known as the Wadesville and Pine Forest collieries. I requested the superintendents of these mines to adopt a proper code of signals, by which the men in charge of the ventilating fans could be notified to stop them at once, should a fire occur, which would be likely to prove destructive to the building; also, to have doors placed in position between the inlet and outlet, to be closed in case of one of these occurrences, in order that the fumes from the burning material could be cut off, should the inside temperature of the mine cause the current to continue its regular course.

It may be asked, and reasonably, too: "What would be the best remedy for this evil?" In answer to which, we say: The law should prohibit the owners of these collieries from erecting, in the future, such building, within a reasonable distance of either inlet or outlet. However, this would not add any to the security of those already in operation. Therefore, we would suggest the appointment of a commission to investigate this matter and to make such recommendations deemed proper by them, to remove the danger, or empower the inspectors in order that they have authority to inforce such changes deemed necessary by them, to better secure the lives of those who are compelled to make a living for themselves and families in these snares.

Ventilation.

As each succeeding year rolls around this question is discussed in these reports and elsewhere, but generally with reference to underground workings, seldom, if it all, has there been anything said in regard to introducing any proper or more efficient system of ventilation, or removing the dense volume of dust from the interior of breakers which those operated at dry, dusty mines are subjected to. I have not the least doubt that such a proposition by many would be considered of small moment. Inasmuch that those places are not subject to explosions of fire-damp, or eruptions of other poisonous gases, neither have we any desire of presenting the subject in that color, but rather under the head of coal dust, from the fact that we consider it immaterial whether the health of persons are injured by gases or other substances. If it is the duty of the Commonwealth to protect its citizens against one evil, it certainly is against the other. I am not prepared to say to what extent coal dust in breakers is injurious to the lives and health of those who are empelled to breathe it ten hours a day from two hundred to three hundred days in the year. We only allude to those dry, dusty mines, many of which are so fearfully charged with constant volumes of floating dust while in operation, that it is a difficult matter to discern boys or machinery while passing through the interior. Often while groping my way through those concerns, I have felt as though I would suffocate before reaching the outside.

Such an atmosphere, loaded with dust, as it is, certainly must be injurious to those who are obliged to breathe it.

The majority of those who are employed in breakers are boys, ranging

in age from seven to sixteen years. When they arrive at about the latter age, they are considered qualified for inside laborers, from which source we draw our miners, who cannot be of a very robust character after serving an apprenticeship in one of those dust mills.

Aside from my own experience in this matter, my attention has been called to the subject by outside foremen and others, and after passing through the different apartments, the question has been forcibly put to me, "Do you consider this a fit place for men and boys to work in, being compelled, as they are, to breathe those solid volumes of dust, which is not much else, for ten hours a day?" adding, very emphatically, "The representatives elected and sent to Harrisburg from the coal regions, always have a strong desire to place themselves on record by offering some amendment to the mine law, and as they say, to better secure the lives and health of the workmen. Those gentlemen never think, for a moment, that the poor boys employed in such places as these, have life or health that should be protected, simply because they have no vote."

The question now arises, can this evil be remedied. In reply, we say it can to a very great extent, by the application of proper devices in connection therewith: First, by erecting large exhaust fans, (say, from twelve to fifteen feet in diameter,) in suitable positions, connected with the rollers or breaking apparatus; also the main screens by which the coal is separated, those parts to be temporarily inclosed by canvas or other suitable material, by which means a volume of air could be conducted through them, carrying the dust with it to the open atmosphere, rendering the place healthful, and relieving the air of the large volume of dust which the employés are obliged to breath. I think this method is employed at one or two of the collieries in the upper region, and works very succesfully.

However, such arrangements cost money, therefore, as long as it is not compulsory with the owners it is not probable that such devices will come into use to any extent, notwithstanding what may be said to the contrary.

There is another point deserving attention in connection with the above question, and that is the tender age of a very large numbers of boys employed in our coal breakers, many of them being under eight years of age. It is true, the law prohibits boys under twelve years working underground in the anthracite regions; but outside they can be sent to work at any age their parents see fit to send them, and, in many instances, the small sums earned by those poor unfortunate boys are spent by their fathers in whiskey mills or grogeries.

I concur with the opinion of many others, that it is a disgrace to our great State to have to say at this period, that we are behind—in this respect—all the great mining and manufacturing States of Europe. I sincerely hope some of our legislators will give this subject their attention at the next session, whereby those objects of pity will be protected.

Non-Fatal Accidents resulting from Explosions of Gas.

Under this heading, there are three accidents, which we consider of sufficient importance to require a few remarks, not so much on account of the accidents to which it refers, but for a warning to others against doing likewise in future.

The first of these explosions occurred in the Wadesville shaft colliery, at which place the workmen are confined to the use of locked Davy lamps. On the morning of the accident, the two men who were burnt met the fire boss as usual at the lamp station, where he notified them that there was gas in their working place, meanwhile instructing them to put up a length of brattice before they commenced working in the coal at the face, in order that the current of air might sweep away the gas. However, instead of the men following out their orders, they concluded to get a car of coal first, which required a blast. But it was necessary to remove the gas before a shot could be fired. In order to accomplish this, one of the men hung his Davy lamp on a prop a short distance from the face in the return current. Then he took a piece of canvas and commenced brushing out the gas. About the third or fourth waft he made, the flame was forced through the gauze, igniting the gas, and the explosion which followed burned one of them quite severely, and the other only slightly. These men, as well as all others in this district, had been enjoined by special notices against entering their working places until the cause of danger, if any existed, had been removed; also, against the brushing or wafting out of gas. It is true that these men were guilty of a misdemeanor under the laws, but, after due consideration, we concluded that they had already suffered quite sufficient for their recklessness. On the other hand, we are of the opinion that the fire boss violated the eighth section of the general mine act:

First. In not seeing that the current of air was carried sufficiently near the face to keep the place free from the accumulations of gas.

Second. If some unavoidable accident had occurred which interfered with the ventilation, it was still his duty to *see* that the gas was removed, and also to give it his personal supervision.

The second explosion resulting from the brushing of gas occurred at Phœnix Park colliery, No. 2, by which four men were burnt, two of them quite severely. Although some of the men that were injured maintain that the explosion was not the result of brushing or fanning the flame through the gauze, yet they all acknowledge that one of their number was in the act of wafting a small quantity of gas from the face with a piece of canvas when the explosion occurred. The above opinion prevailed from the fact that Mr. Welsh, who was brushing the gas, was in the habit of working with his safety lamp hung or suspended at his belt; but, after our investigation of the matter, we are still inclined to our first opinion that the flame was driven through the gauze. The inside foreman and fire boss had only left this place about fifteen minutes prior to the explosion. They

stated that they examined the place when they were in it, and found it clear of gas. This statement was also corroborated by the four men who were burnt.

It is an old saying that corporations have no souls, but I am glad to say that there are exceptions to this rule, as in this case. When we made an appeal to the company's chief engineer, S. B. Whiting, Esquire, stating to him the distressed condition of one of the unfortunate men, the Honorable John Welsh, Mr. Whiting at once gave instructions to the colliery superintendent to send persons to attend the wants of Mr. Welsh, and also of Mr. Brady, another of the injured. The last-named men were the two that were so severely injured. All their expenses were paid by the company. I here take the liberty to return my sincere thanks, also those of Mr. Welsh and Mr. Brady, to Mr. Whiting and the company for their prompt acts of kindness.

The third explosion occurred in the Colket colliery, by which one man was severely burnt, and three others slightly injured. Among the latter were the inside foreman and also the fire boss, who, at the time of the explosion, were up in a new breast not far from where it occurred. A few moments before the explosion occurred, a shot had been fired in the face of the gangway, liberating a large quantity of gas, (fire-damp,) which appears to have been a sufficient amount to charge the ventilating current to an explosive point. The man who was nearest to the face of the workings at this time was employed in driving a schute. He was the first to detect the presence of gas in his safety lamp. In his excitement, he took his lamp with the intention of going down on the gangway for a place of safety. But the schute in which he had to go down was the opening through which the return air current traveled. In consequence of its small area, the velocity was rapid. This, in connection with the fact that the unfortunate man was moving hurriedly against the current to escape the danger, was sufficiently great to pass the flame through the gauze, igniting the explosive element with the result already given.

Underground Mine Fires.

This district has been the scene of two disasters of this class during the year; both of which have fortunately been extinguished. The first one occurred at the Richardson colliery during the month of February, resulting from igniting a blower of gas in a breast of loose coal in the Daniel vein. In this case it was found necessary to flood the mine in order to extinguish the fire. In consideration of the very extensive workings that were opened on both north and south dips, the company's officials determined to flood that section in which the fire existed, without flooding the other portions of the workings. To make this plan effectual it was necessary to erect a strong barrier that would be of sufficient strength to resist a vertical head of water two hundred and seventy feet (270) high, equivalent to a pressure of one hundred and sixteen pounds (116) per square inch.

The position selected for its construction was about the middle of the tunnel which connected the vein on fire with the one on which the main hoisting and pumping slope is sunk. Another tunnel south from the bottom of the slope, passing through the synclinal axis, opens the north dipping seams, which have been worked very extensively. The seat or foundation on which the breast of the dam rested, was about two feet in depth and cut out of a small seam of coal, rather free, and passing through the tunnel at right angles, pitching about 55°. The dimensions of the tunnel at this point are seven feet six inches high, by ten feet wide, having an area of seventy-five square feet, which surface would be exposed to a total pressure of six hundred and twenty-six and four tenth tons at two thousand pounds per ton; or, if we take the whole surface of the barrier the pressure would be eleven hundred and nine tons, nearly double the other pressure. The structure was built of dry pine timbers, the breast of which was composed of pieces fourteen inches square by fourteen feet in length crossing the tunnel at right angles, and supported by two vertical pieces fourteen by eighteen inches and ten feet long, cut in the solid rock (see sketch CC) eighteen inches in top and bottom. These were again supported by braces eight by eight inches square and eight feet long, imbedded in the rock and laid close on each other, (see sketch DD.) A manhole was left in the dam sufficiently large to allow a person to pass through, then the recesses between the rock and timbers were tightly filled with dry pine wedges and oakum. After this was complete the manhole was closed by a door provided for that purpose and the inclosed portion of the workings allowed to fill with water. A common-pressure gauge was attached to the dam to show the pressure, from which the height was ascertained. The greatest pressure indicated was one hundred and sixteen pounds per square inch, at which height the supply of water was discontinued.

The second fire occurred in the workings of the noted Wadesville shaft. This also was successfully dealt with, after considerable expense and not a little anxiety on the part of all concerned in it.

Fortunately the outlet passed through the old Hickory workings, and was within a reasonable distance of the scene of the fire, through which a large stream of water was running. A temporary dam was thrown across the opening far enough up the pitch to force on the fire a stream of water, which was conveyed thither through a line of three-inch pipes laid for that purpose. In this manner the fire was subdued.

As each year rolls by, these fires are becoming much more frequent, and much more disastrous, than at earlier dates. This is not very surprising, when it is taken into consideration that the mines of the present day are much more extensive, and the depths are rapidly increasing, and the quantities of explosive gas increasing at the same ratio. But when we turn our attention again to the fact that the science of mining is also making rapid strides, it would appear that there is a lack of something in our management, or discipline, or the condition of things should be reversed. It

Cross Section

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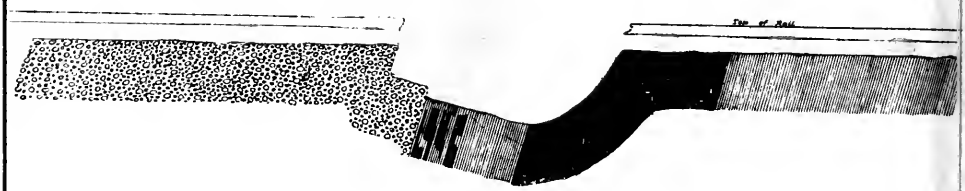


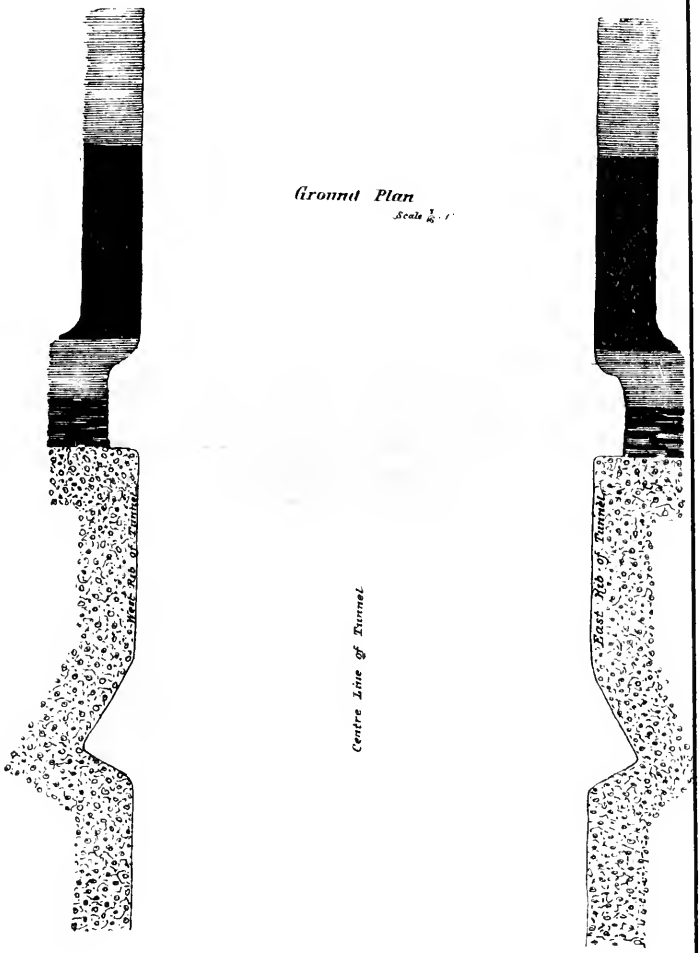
Plan and Section of

—— erected in ——

RICHARDSON COLLIERY

Feb. 1881 to flood a portion of the Mi

Copied Pottsville, March 17 1882, for S. Gay Hale Mining Insp



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extinguish the fire.

is an old saying, and one that is worthy of being remembered, and that is, that "An ounce of prevention is worth a pound of cure." The best preventives we can recommend are: First, strict discipline; second, careful supervision and close observation, and more frequent examinations of all working places where persons are employed—more particularly in places where powder is being used. In addition to these precautions, it is probable that a higher grade of explosives might be used in our fiery mines, in place of the common powder, which is constantly dreaded every blast, lest it would ignite blowers of gas hidden beneath the débris in moderate pitching seams, or in large bodies of loose coal, where the seam is worked by the run, or have to be kept full in order that the workmen might have a foundation to stand upon. Since we cannot always guard against occurrences of this nature, it is much better to be prepared to meet them with proper means, or appliances, than to be found wanting; for time, in such cases, is very valuable, and the loss of a few hours, possibly less, often results disastrously. A few hundred feet of good hose, with suitable connections to the pump columns near the bottom of the shaft, or slope, would frequently render valuable service. However, since, in many cases, it would require thousands of feet of hose to be of any practical use, where a fire occurred at a great distance from the bottom of the shaft, or slope, it would require a considerable outlay in "dead stock," as it is frequently termed; which, to an individual operator, might be a severe loss. But supposing the land owners, who are quite as much interested in the safety of the mines as those operating them, should form a compact with the tenants of a district, which might comprise ten or twenty collieries, each party to furnish a certain quota, say a sufficient amount of hose to make up an aggregate length of from one to two miles, to be kept at the most convenient point, or as near the center of the district as possible; with our present local advantages in transportation and telegraphic communications, such appliances could be removed from there to any of the surrounding collieries inside of an hour. I venture to assert that, with such an arrangement, many thousands of dollars and much valuable property would have been saved during the past, and much more in the future.

Use of Noxious Gas Apparatus.

For the last two or three hundred years many devices have been employed in order that men might descend to considerable depth under water, and there perform manual labor with but little inconvenience. During later years there have also been similar mechanical contrivances brought into use in many of the great mining districts of Europe, in order to enable persons to live for a given length of time in an atmosphere charged with poisonous gases to such an extent that it would not support animal life.

The object of this invention was to make it practicable for men to make explorations in the dark recesses of mines, after explosions, or other causes, whereby the workings are filled with noxious gases. The great value of

such a devise at collieries oftentimes would be incalculable, in saving both life and property. As an illustration take the Kehley Run disaster; with such an appliance the men who lost their lives could have made the examination they desired and returned safely. Many others jeopardize their lives in attempting to find those who are lost. A few days after the Kehley Run occurrence I was called to the Kohinoor colliery on account of an explosion of fire-damp. When I arrived at the colliery I was informed that one of the men had not been found, neither could any one reach the place he was supposed to be in, owing to the air current being broken by the force of the explosion, and no person was willing to endanger his own life to recover what they supposed to be a lifeless corpse. It was only by risking my own life that the man was taken out, and, I am pleased to say, after restoratives had been applied for several hours, he was resuscitated. Had the colliery been provided with a noxious gas apparatus, the man would have been rescued long before I arrived. Again, such a device would often render valuable service in extinguishing fires. I know of cases where a few bucketsful of water would have quenched the fire if the workmen could have reached a point near enough to it to discharge the water on the burning débris; but this they could not do in consequence of the gases given off by the fire. Hence, other plans had to be adopted, *i. e.* to establish a sufficient air current to sweep away the gas and try to render it harmless. This mode generally requires much labor; and about the time they have completed their arrangements, the methods become useless, that would have been successful in the first instance. Hence, as before stated, it is always best to be ready for emergencies.

Improvements.

Under this head there has not been a great deal done up to the present time that requires special mention; however, the future of this district looks brighter than for several years passed, although it may not change the producing capacity to any great extent for the year of 1882. Nevertheless, the mining population of the Schuylkill Valley, already begins to feel the effects of that which has commenced.

The first noticeable improvement under way is a new shaft, being sunk by the Alliance Coal Mining Company, an incorporated body. Among its members are some of the leading men of New York city, of whom Mr. Edward Cooper and Abram S. Hewitt, a son and son-in-law of the venerable Peter Cooper, are the best known. The Jersey Central forming part of the compact, Mr. Joseph Harris, the well-known mining engineer and the present general manager of the Jersey Central railroad, is one of the directors. This company are the owners of several tracts of coal lands in this district, amounting to nearly four thousand acres.

The new colliery is located on the tract known as the Kaska William lands, and on the south dip of the second basin, south of the Broad mountain, and situated about two miles north of Middleport, and ten miles northeast of Pottsville by rail.

The proposed plan is to sink the shaft three hundred and sixty (360) feet. (It being the same elevation above tide as the bottom of the old slope workings on the White Ash seam, which was abandoned about fourteen years ago in consequence of one of those disastrous underground mine fires.) From this point a tunnel will be driven north, and within a safe distance of the old White Ash workings. Through this barrier a hole will be bored to tap the waters in the workings, which will be hoisted out through the new shaft; when this is completed, the shaft will be continued down until all the members of the Mammoth seam are cut, which is estimated to require a depth of about six hundred (600) feet, and is expected to give them about one lift, or three hundred (300) feet below the lowest point of the old slope workings. Nine hundred (900) feet north of the slope a water level tunnel, which was driven several years ago to the Mammoth vein, from which the south dip in the first basin was worked, is now being extended to the Buck Mountain vein which underlies the Mammoth. Should it turn out favorable, quite a body of coal can be won from this tunnel above water level.

Palmer Vein Colliery.

This colliery is also owned and operated by the Alliance Coal Mining Company, and has received considerable attention during the past year, both underground and on the surface. The capacity of the breaker has been greatly increased. The dumping chute has been lengthened ninety (90) feet. A new counter screen was put in, and other necessary arrangements to facilitate in handling and properly preparing the coal. A new plane has also been built near the head of slope, and a pair of engines erected to hoist the coal to the same elevation with that of the dump chute. New boilers have been added to those previously in use. The present slope has been re-timbered in a very substantial and workman-like manner, and other parts of the inside have received attention. The two outlets, spoken of in my last report, have been driven out to the surface, affording an available outlet to that section of the mine.

Kalmia Colliery.

Operated by Phillips & Shaefer. A new breaker has been erected during the year, in place of the one destroyed by fire on May 25. The burning embers had hardly died out, before work was commenced in good earnest clearing the old site for a new breaker. In sixty-five working days, after this disastrous fire occurred, the new structure had been so far completed, that the colliery was re-started and one hundred and twenty cars of coal per day was prepared and shipped from the new breaker. During the ninety days it required for its completion four hundred and twenty thousand feet of lumber were used.

Eagle Hill Colliery.

Owned and operated by the Philadelphia and Reading Coal and Iron Company. Situate about six miles north-east of Pottsville. The company

are making preparations for extensive improvements; work is now under way, pumping the water out of the Old Charter Oak mine, sunk on the Primrose vein. It is the intention of the company, after the water has been removed, to sink down one more lift, or down to the basin, from which point a tunnel will be driven north to the Seven Foot or Mammoth vein, now being worked by the Eagle Hill colliery, and several hundred feet below the present workings; this is required to gain a deeper level than is now being worked. Also, to make one direct hoist from the new levels to the surface. The coal now being mined has to be handled twice, first through the inside slope then through the shaft.

Otto Colliery.

Owned and operated by the Philadelphia and Reading Coal and Iron Company. At this colliery a new slope has been sunk on the Holmes vein, one hundred yards below the present workings. From the bottom of this new opening a tunnel will be driven north and south, to cut the Primrose or Gray Ash, also White Ash veins. From the present White Ash vein workings two openings are now being driven, for the purpose of tapping a large body of water pent up in what is locally known as the White Ash colliery, which has been abandoned for several years. When the water is removed a large body of coal can be mined from the same levels that are now being worked by the Otto. This, with the new workings when opened, will facilitate the colliery to produce a large quantity of coal.

No. 10 Colliery.

This mine is owned and operated by the Lehigh Coal and Navigation Company. The breaker which was commenced in 1880 was completed the early part of this year; two new fans have been erected. One twenty-one feet in diameter, and of the guibal type, the other is twelve feet in diameter, and is used to ventilate the water level tunnel where a steam locomotive is used for haulage.

Glendower Colliery.

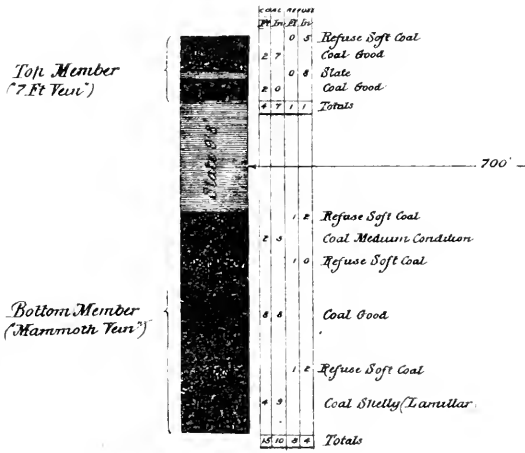
This mine is also a Philadelphia and Reading Coal and Iron Company colliery, and for some time passed has been falling behind in its shipments, but improvements are now underway to make it a first-class colliery. An opening is being driven from the face of the lower west gangway, through which the water in the old Monterey slope will be tapped. It is expected a large body of fine coal will be available, which heretofore could not be worked in consequence of the water.

During the year the water in what is known as the old Fulbert slope workings has been tapped through the Mine Hill Gap colliery, furnishing the colliery with a considerable amount of coal. The company officials have been very successful in this work, and have taken every precautionary measure to insure the safety of the workmen. In this case two holes were driven parallel, having a four yard pillar between, and cross-headed every

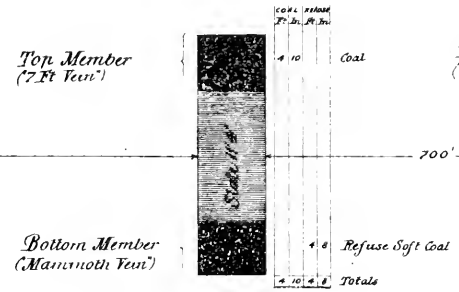
SECTIONS
— OF —
MAMMOTH VEIN
— *cut in the* —
POTTSVILLE COLLIERY

Pottsville March 17th 1882

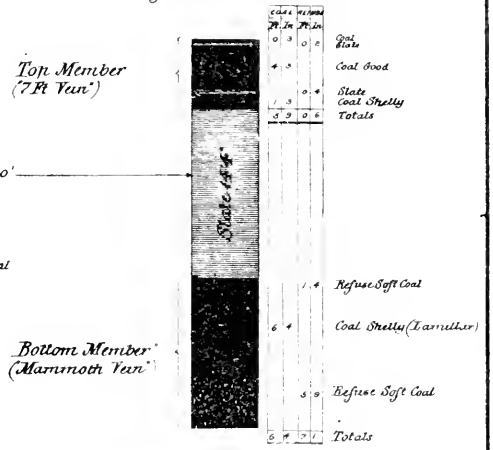
Section
700 Ft West of Upper Main Tunnel on same level



Section
on line of Upper Main Tunnel



Section
700 Ft East of Upper Main Tunnel on same level



REFERENCE:

1. Shaft.
2. Upper Tunnel.
3. Lower Tunnel.
4. Primrose Tunnel.
5. Peach Mountain or Lewis Seam
6. Little Tracey.
7. Big Tracey.
8.
9.
10.

Top of Shaft above tide 729 Ft.

20

No. 2.

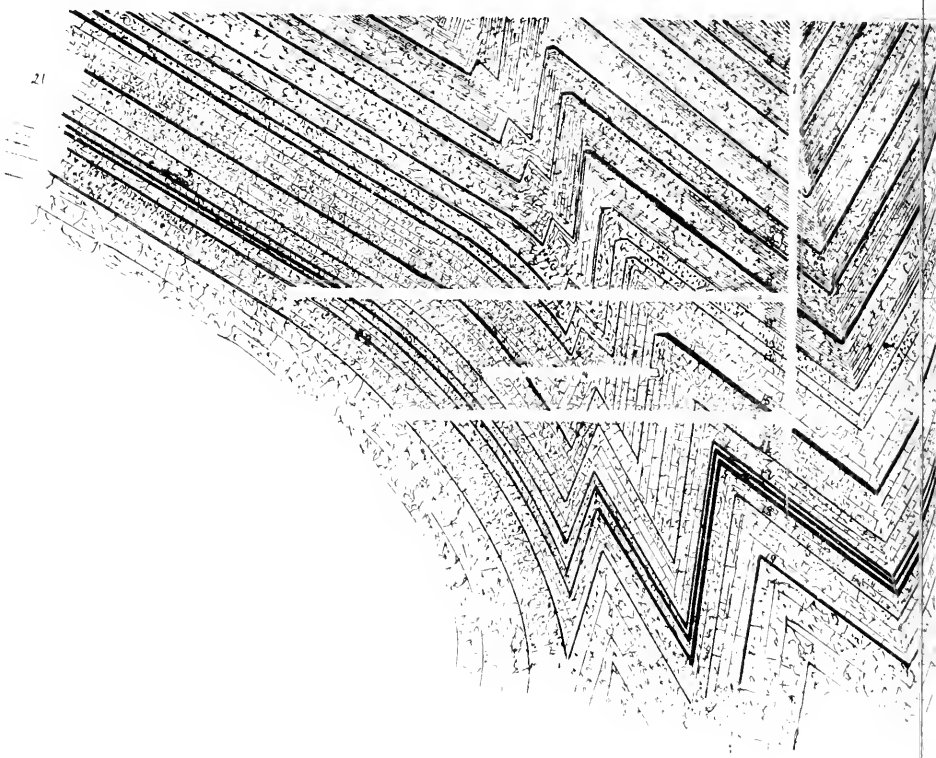
Transverse Section,

Showing the Geological Formatn

Pottsville Colliery

SCALE, 1125 feet to one inch. Samuel W,

Top of Shaft above tide, 729 feet.



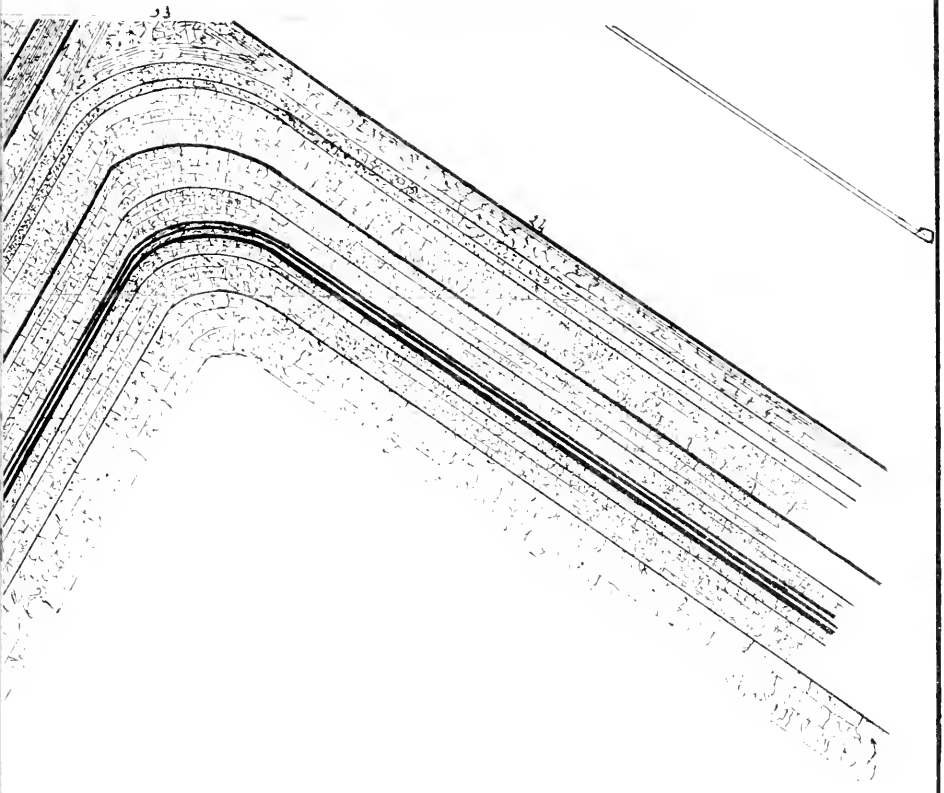
REFERENCE:

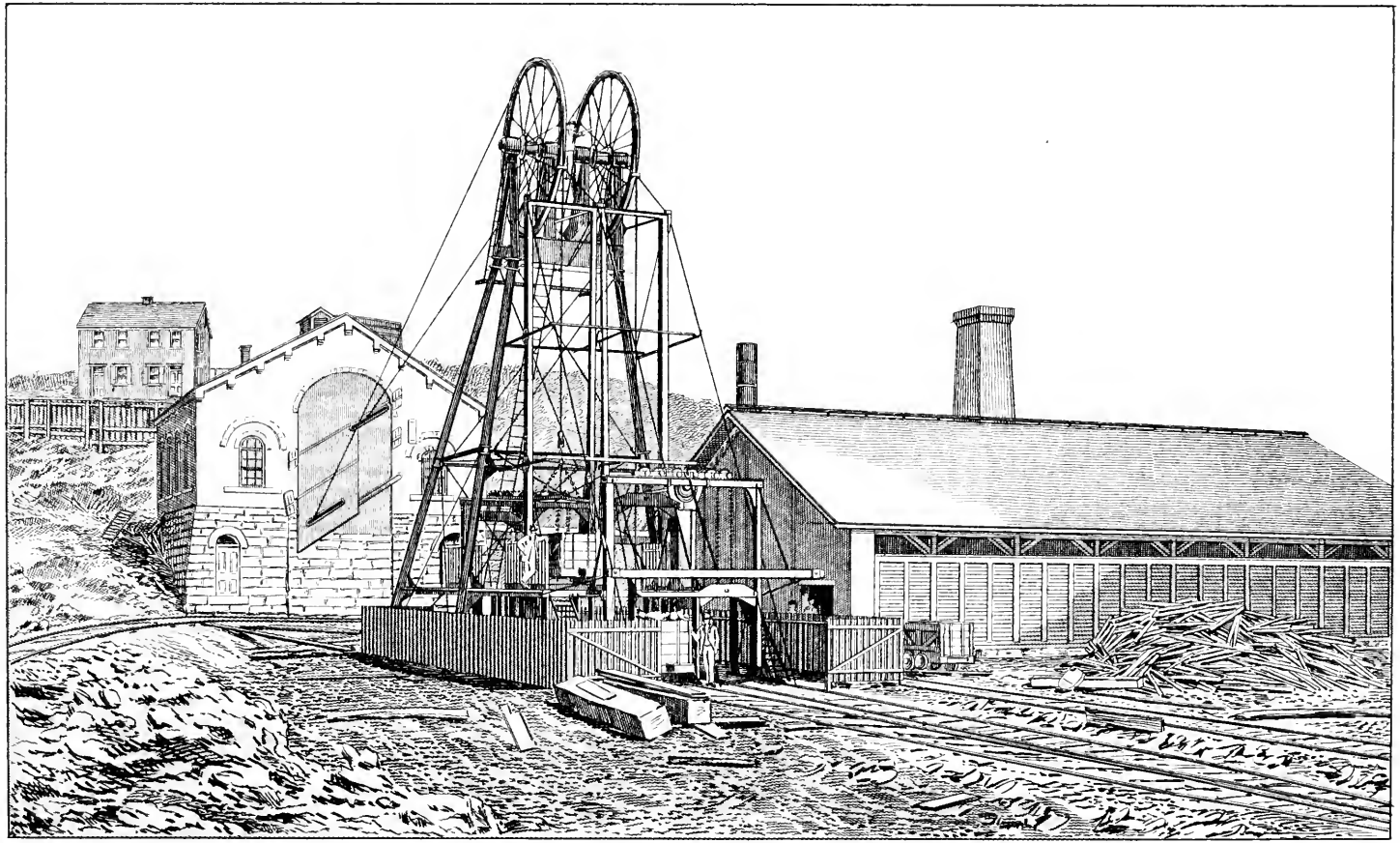
11. Big Diamond.
12. Rought.
13. Little Orchard.
14. Big Orchard.
15. Primrose.
16. Holmes.
17. Four feet, Seven feet & Mammoth.
18. Skidmore.
19. Buckmountain

REFERENCE:

20. Wadesville Shaft.
21. A Probable Anticlinal.
22. Line of Connection between Tunnels
23. Crown of Anticlinal Broken off.
24. Diamond Seam Counter, Part of No. 11.
25. Lewis Seam Counter, Part of No. 5.
26
27.

, Inspt.





SHAFT AT "POTTSVILLE COLLIERY."

fifteen yards, a bore hole was kept ahead. When they got within twenty feet of the old workings a cross-heading was driven close to the face in order that the men could escape in the dry hole, and pass down in safety, after striking the drill hole through and tapping the water. Another noticeable feature in the way of improvements among the Philadelphia and Reading Coal and Iron Company collieries is the pumping of the water out of Middle Creek shaft, which was temporarily abandoned, the latter part of 1877 or beginning of 1878. This is comparatively a new colliery, with complete and powerful machinery and a new breaker of modern design. The shaft is sunk six hundred and eighty feet. Through this opening the company intend to work the coal which properly belongs to the Pine or Swatara colliery, below the levels now being worked.

There still remains a good quantity of coal on the old level. If the mine (Pine) should be continued deeper, it would require a large amount of improvements; therefore, as they have the facilities at Middle Creek they intended to put it into operation, which, I think, to be a very wise move.

Among the many improvements being made, we may mention that during the year several thousand feet of speaking tubes have been placed in the different slopes, and a number of breaks attached to drums.

POTTSVILLE COLLIERY.

A Description of its Openings and Geological Features.

This colliery is located near the center of the southern coal-field, and consists of two shafts fifteen hundred and ninety-six feet deep.

The last seam sunk through was that known as Primrose, which was cut at a depth of fifteen hundred and seventy-two feet. The shafts are situated on the strike of the measures running east and west and are seven hundred feet apart.

The west shaft is twenty-three feet by eleven feet six inches and divided into three compartments, each seven feet by eleven feet six inches. One of the divisions is separated from the other two by a brattice composed of white pine planking and was intended for the upcast of the colliery. However, in consequence of the ventilating fan being placed at the top, the leakage became so great that it was necessary to convert the whole into an upcast. The east shaft is fifteen feet eight inches by eleven feet six inches in the clear, and divided into two compartments, both of which are used for hoisting purposes, and also serve as the down cast.

These are the deepest coal shafts yet sunk in the United States, passing through all of the coal seams contained in the upper coal series, with the exception of one, known as the Sand Rock vein, it being the uppermost in the anthracite coal measures of noticeable dimensions.

Twelve seams of coal of various thicknesses were cut during the sinking. At the depth of four hundred and eighty feet, the Big Tracy seam was passed through, striking its synclinal axis.

From the top down to this point the openings had been sunk through all north dipping measures, but from here down to the bottom the meas-

ures were reversed, all dipping south and having angles from thirty-five degrees to thirty-seven degrees. The Big Diamond seam was cut at a depth of eleven hundred and eighty feet having seven feet of good coal. Four hundred and twenty feet below this point the Primrose vein was cut, it being fourteen feet thick and coal good. Here the sinking was discontinued and a bore hole put down four hundred and ten feet deeper with a Diamond drill, at which depth it is claimed that the Seven Foot or top member of the Mammoth with twenty-seven feet of good coal, was bored through. In consequence of the boring rods getting fast and being broken, the boring was also discontinued.

In the Primrose vein, gangways were opened east and west. The former was driven nearly one thousand yards, it being regular, and the coal good. At this point the gangway is left standing, owing to some small local trouble. The west gangway has been extended about nine hundred yards, where the western end of the anticlinal axis was met still declining to the west, cutting off the run of the breast until they became so short that it was unprofitable to continue driving them.

Three hundred feet above the first level, a counter gangway was driven until it met with the same trouble as in the lower one. On this level and seven hundred and fifty feet west of the west shaft the gangway was driven around the point of the anticlinal. From here a tunnel was driven about six hundred and fifty feet north. [See sketch.] On the first shaft level, and midway between the two shafts, a tunnel has been driven fourteen hundred and fifty feet. When it was started it was expected to cut the Seven-Foot and Mammoth seams at about five hundred feet. However, in consequence of the unforeseen anticlinal which has been previously alluded to, the tunnel passed over the seams without cutting them. The tunnel was still pushed ahead into the second basin, north of the shafts, cutting the Primrose, Holme's, Four-Foot, Seven-Foot, Mammoth, Skidmore and Buck Mountain seams. All of them, however, were found in a crushed condition, which is not very surprising when taking into consideration their close proximity to the synclinal axis, where the greatest natural forces have been exerted in doubling the strata.

As before stated, four hundred and twenty feet above the Primrose, the Big Diamond was opened and gangways extended east and west. Coal is still being mined from this seam.

From this level a tunnel has been driven also 1,850 feet, and is located immediately over the Tower tunnel. It is parallel to it, passing through the red ash seams that intervene between the Primrose and Diamond in the first shaft basin. It also cuts the same on the north side of the saddle. It will be seen by looking at the sketch which shows a cross section of the formation, that this tunnel has also been driven into the second basin north of the shafts. At the distance of thirteen hundred feet from the starting-point the Primrose vein was cut in five feet of good coal. Three hundred and sixty-two feet from the last-named seam the Four-Foot was cut in three

feet of excellent coal, having a good top, with a layer of soft undermining, next to the bottom slate. Eighty-five feet from the Four-Foot, the Seven-Foot was passed through in fine condition and about seven and a half feet thick. Twenty feet further on the Mammoth seam was opened, the vein being soft where the tunnel passes through it and only about six feet thick. This, we think, is nothing more than a local disturbance, and, without doubt, the coal will be found good both east and west.* One hundred and ten feet north of the Mammoth the Skidmore was cut, it being irregular and mixed with slates. Both tunnels have been connected at the face by two openings, driven parallel to each other, in the last-named seam. These openings serve as a traveling way from one tunnel to the other, also as a return airway.

There has been much comment and various opinions expressed through the press and otherwise in reference to the location of this colliery; however, it would be a hard thing to find two men who agree on the same point. Some of the critics say that the shafts should have been sunk east, others west, and more north of their present position; but, so far as the excavations of the underground workings have been extended, the indications are that the colliery is situated in the proper place, or nearly so.

That some mistakes have been made cannot be denied; but, on the other hand, where is the man that could have exactly located a colliery in an undeveloped part of a coal-field similar to the southern Schuylkill in its geological formation, where all the freaks of nature have been brought into operation, pressing vertically, and latterly converting the whole coal-field into an innumerable number of basins and saddles, with the angles varying from 10° to 90°. In many places, the north dips are inverted, so that none but the south dipping measures are exposed on the surface.

Another noticeable feature in connection with its geological structure, and which will be seen at a glance by examining the vertical or shaft section on the sketch, is that the upper series have been gradually pushed northward to such an extent that the synclinal and anticlinal axes have been thrust from their natural vertical position into that of an oblique, in consequence of the lateral pressure from the southern portion of the field. Therefore, although the shafts may be located in the center of one of these basins on the surface, by the time it reaches the depth of one thousand feet the bottom may be several hundred feet north of the expected point or synclinal axes desired to be reached.

These are not false theories, but facts, as developed in the sinking of these shafts; and, if they were failures, as they have frequently been reported to be, there is this consolation, that the money spent in this enterprise has furnished a key to a problem that has been hidden nearly sixteen hundred feet below the surface for thousands of years, and, in future operations, it will be a benefit to those who spend their money to sink shafts in the deep basins of the southern Schuylkill coal-field, provided they study

* Since the above was written the Mammoth vein has been cut seven hundred feet west of the tunnel, in fifteen feet of good coal.

and become acquainted with that which is made evident in sinking Pottsville shafts.

There have been, and still are many reports circulated at home and abroad that the capital invested is lost, and that the colliery is an entire failure. This is by no means correct. Therefore, as the prosperity of the people of this county depends upon its coal-producing capacity, though such rumors may not have been detrimental to that prosperity, it certainly has not been favorable to its advancement.

On these grounds, I think a short description of the colliery, with its geological formation and surroundings, would not be out of place; also an accompanying sketch, showing a cross section of the same as it has been developed.

It is true the quantity of coal in this piece of territory is much less than the projectors anticipated finding. They were not alone in their hopes, for many others shared in the same high opinion at the commencement of the undertaking, until some of those unforeseen anticlinals became unfolded.

Then the skill of the engineers in charge was extolled by the press and others. It is also true that the colliery has not yet produced any large quantities of coal. Notwithstanding this, the territory contains sufficient coal to make the colliery a productive one for many years to come.

We are often asked by parties when making similar remarks in reference to this mine, "Why is there not more coal produced from it at the present time?" The only explanation we can give to such queries is that the company does not want the coal, or by referring them to the colliery officials. But this I can say, that it is not through lack of coal, for I am of the opinion that the Seven-Foot vein alone in the second basin could produce five hundred tons per day. At the present time there are between twenty-five and thirty breasts opened in this vein, but none have been worked, although the vein in quality and thickness is up to the average found elsewhere.

As previously stated, the tunnel on this level passes through several small red ash veins, which are not considered workable at the present time. Nevertheless, the Primrose and Four-Foot seams are of a workable thickness and coal good.

Nothing, up to the present time, has been opened on these seams, neither has any effort been made to determine how far these beds of coal continue in good condition below the upper tunnel, with the exception of where the lower tunnel was cut through them, where they were found in a crushed condition, resulting from its near relation to the synclinal axes, which are very abrupt.

Notwithstanding this disturbance, there is no question but that the two previously mentioned veins, viz: Four-Foot and Seven-Foot will be found some distance above the lower tunnel in a good workable condition, which is certain to give from three to five hundred feet of a lift, below the present Seven-Foot gangway now being worked in the upper tunnel. This coal

can be worked by either plain or counter chute driven from the bottom tunnel, or by extending the tunnel already driven six hundred and fifty feet from the counter gangway on the Primrose vein, west of its anticlinal, requiring a probable extension of four hundred feet.

Shaft or First Basin.

If we take as a hypothesis the south dipping seams cut during the sinking, particularly the Primrose and Diamond, which are now being worked, and as previously stated, have proved to be equal in quality and thickness as they have averaged in the surrounding basins, which, as a general rule, is found to hold good. Therefore, if we should be allowed to take this as a comparison, it is very reasonable to expect to find the Seven-Foot and Mammoth in the same condition, whenever they are cut in this same basin at a reasonable distance from its synclinal and anticlinal axes.

Since it is a well proven fact that the two latter seams are by far the most reliable coal beds in the whole anthracite measures. One of the mistakes made by the engineers was that one of the shafts was not sunk down to the white ash seam in this basin, which, beyond all doubt is good. There is one other important point bearing upon this same subject which goes to strengthen the foregoing theories, and should not be overlooked, *i. e.* That the Mammoth and Seven-Foot seams in the same basin and dip east of this colliery, have been worked at the Eagle Hill colliery for the last twenty-five or thirty years, producing large quantities of coal, and both seams proving unusually good, and will be, for the next quarter of a century at least, one of the best collieries in the company's possession. In this basin the Mammoth and Seven-Foot may still be reached by a tunnel driven east of the east shafts near the face of the present Primrose gangway, with a probable large amount of coal in a workable condition between this level and the anticlinal axes, since the latter rises rapidly to the eastward.

North Dipping Seams of this Basin.

These seams can be reached by a tunnel of a very moderate length, as will be seen in looking at the accompanying sketch. What their condition is in this locality is not known with any degree of certainty, since the lowest recognizable seam coming out to the surface on this dip is the Diamond. This vein has a run on this pitch from the bottom of its basin of not less than thirteen hundred feet to the surface. Since this is an established fact, it is evident that the seams underlying the Diamond should have a run on the same pitch within their respective axes equally as great. In this it is altogether probable that the distance is much greater, in consequence of the crown of the anticlinal over the Diamond being broken off.

We do not pretend to know what the condition of these north-dipping seams are. Nevertheless, it is very probable that the Primrose, Seven-Foot, and Mammoth cortain a large body of workable coal.

The Second Basin, South of the One in which the Shafts are sunk.

Another large body of coal on the south dip of the next basin, south of this anticlinal, may be won from these shafts, which would require a tunnel less than one thousand yards in length from the present shaft bottom, [see cross-section,] assuming that the strata intervening the seams has held its general relative thickness at right angles with the different pitches. So far, we have not seen anything to change our opinion to the contrary, as far as this immediate locality is concerned, on a line running at right agles with the strike of the measures, or running from north to south. Under these conditions, such a tunnel would develop the north dips, and show their condition; also, the south dips of the Skidmore, Mammoth, and Seven-Foot in the basin under notice. The Mammoth and Seven-Foot having a lift of not less than nine hundred feet on the pitch above the level of the tunnel up to the anticlinal axis, which rises to the eastward, with a similar declination westward, until it reaches the central part of the basin, which seems to be about the west branch of the Schuylkill, continuing its course east and west for not less than fifteen miles in an unbroken line. These may appear to be strong assertions. Nevertheless, we believe this basin to be quite sufficiently developed to warrant the position we have taken. It is true that the white-ash seams have not been worked in this basin to any extent. The best reason we can assign for this is that it would require deep shafts, and also a large amount of money to open them, as they do not crop out to the surface. Nevertheless, the red-ash seams in the upper coal series that have come to the surface have been worked very extensively during the last half a century. What we have previously said in reference to this basin is fully verified by a chain of old workings, extending from the west branch of the Schuylkill westward to Silver creek on the east, a distance of nearly eight miles in an air-line. Within this space, there have been eight of the longest slopes on one continuous dip, and one continuous line, running east and west, that have yet been worked in this coal-field, opened on the Lewis or Spoon vein. The longest of these slopes is that on the western end, it being about fifteen hundred feet long, on an angle of 27°; whilst that on the eastern end is a little over thirteen hundred feet, on an average pitch of 33°. In the whole distance between these slopes, we may safely say that the variation in the pitch does not exceed 5°, as far as any of the workings have been extended. The above does not represent the length of this basin by any means, not even on the Lewis; hence, the white-ash seams extend a much greater distance east and west.

We question whether there can be a stronger chain of evidence produced from any other part of this coal-field on which a similar hypothesis may be rested. The question may be asked, "What influence or bearing have these red-ash veins referred to upon the white-ash veins in question?"

In answer to such we say: "Probably none whatever, more than increasing their densities through the superincumbent strata." However, it is quite evident from all developments, whether they have been the result

of artificial means, or that of nature, that the folding of the strata did not originate from any great natural forces on the earth's surface, but rather from its interior. Therefore, had the white ash seams been folded or disturbed to any extent, the same would have been manifested in the red ash workings alluded to. We may still adduce further proof, if it was necessary, to the workings on the Diamond seam in this basin, which is a counterpart of that being worked in the Pottsville shafts, and was cut over a thousand feet nearer the white ash veins in sinking than the Lewis, (locally called in the shaft basin, the Peach Mountain seam.) Taking these facts as they have been developed, we think it affords much practical as well as theoretical ground on which we base our opinion. Notwithstanding what may be said to the contrary, a chain of unlimited proof may yet be produced in connection with that we have aleady advanced, proving this basin beyond all doubt to be the most regular and less disturbed of all others within the southern coal field.

We have already said much more on the subject than we had contemplated in the beginning, but as the available coal within our county limits is the main artery on which more than one hundred thousand souls have to depend for their living, we consider the question of vital importance to them.

Before passing judgment upon its future results, there are three other favorable items connected with the workings of these shafts, and should not be overlooked. They are:

First. Their distance being several miles nearer the great eastern markets than the collieries situated in other coal fields.

Second. The workings are comparatively free from water.

Third. And last, but not least, the small amount of fire damp that has been eucountered so far, which is a very favorable point of economy, and adds, also, to the safety of those employed.

We have no desire whatever to convey the idea that mining coal in these particular basins or elsewhere in the southern coal field, is always going to be plain sailing. This is not our intention by any means; for it is just as natural not to expect to meet with all kinds of disturbances in the mining operations in this coal field, or any other, that has been subjected to the same great natural forces, as it would be to expect to cross the Atlantic ocean during the equinoxial seasons without encountering any storms; and like our English contemporary, who thinks the man that can master the geology of the Bristol coal field fit to live in any part of the world, we think the same of the man who masters the geology of this coal field. We may go a little further, and say that the man who could have located the Pottsville shafts without making some mistakes, or meeting with some unexpected obstructions, could justly lay claim to be infallible.

Machinery.

The permanent plant of the colliery was designed by S. B. Whiting,

Esquire, and built under his personal supervision at the Pottsville iron works, owned by G. W. Snyder, of Pottsville, Pennsylvania.

The hoisting machinery consists of a pair of powerful direct acting horizontal engines, on the Cornish valve principle, with cylinders forty-five inches in diameter, and five-feet stroke. The crank or drum shaft is of wrought iron, its journals or bearings being eighteen inches in diameter by thirty-six inches in length, supported by two massive pillow blocks. The winding drums are of the spiral cone type, their largest diameters being twenty feet six inches, and the smallest fourteen feet six inches. Their length from one extremity to the other is fourteen feet, six inches.

The small ends of the cones are supported by one heavy cast-iron center or spider, through which medium the torsional strain is transmitted from shaft to drums. The larger sections of the cone are provided with four inside ribs, two on each side of the main center, perforated with holes at suitable distances. There are also four hubs on the shaft which are five feet in diameter, and are perforated with holes to correspond with those in the cones. Through which one hundred and twenty-four one and one fourth inch iron rods are secured by nuts.

The valve gear is operated by a revolving shaft provided with suitable arrangements to give motion to the links, and is actuated by direct connections with the main crank-pins, which are provided with drag cranks, so as to reduce the stroke of this part of the machinery to proper proportions.

The Governor.

Another mechanical contrivance receiving its motion from the same shaft, is the governor, by which the speed of the engines are regulated. The following instance will explain its utility: Supposing the officials should consider one thousand feet per minute sufficient speed for the cage to travel up or down the shaft, the governor could be so adjusted that the engines could not run at a higher rate of speed than that actually necessary to raise a given quantity of material in a given time.

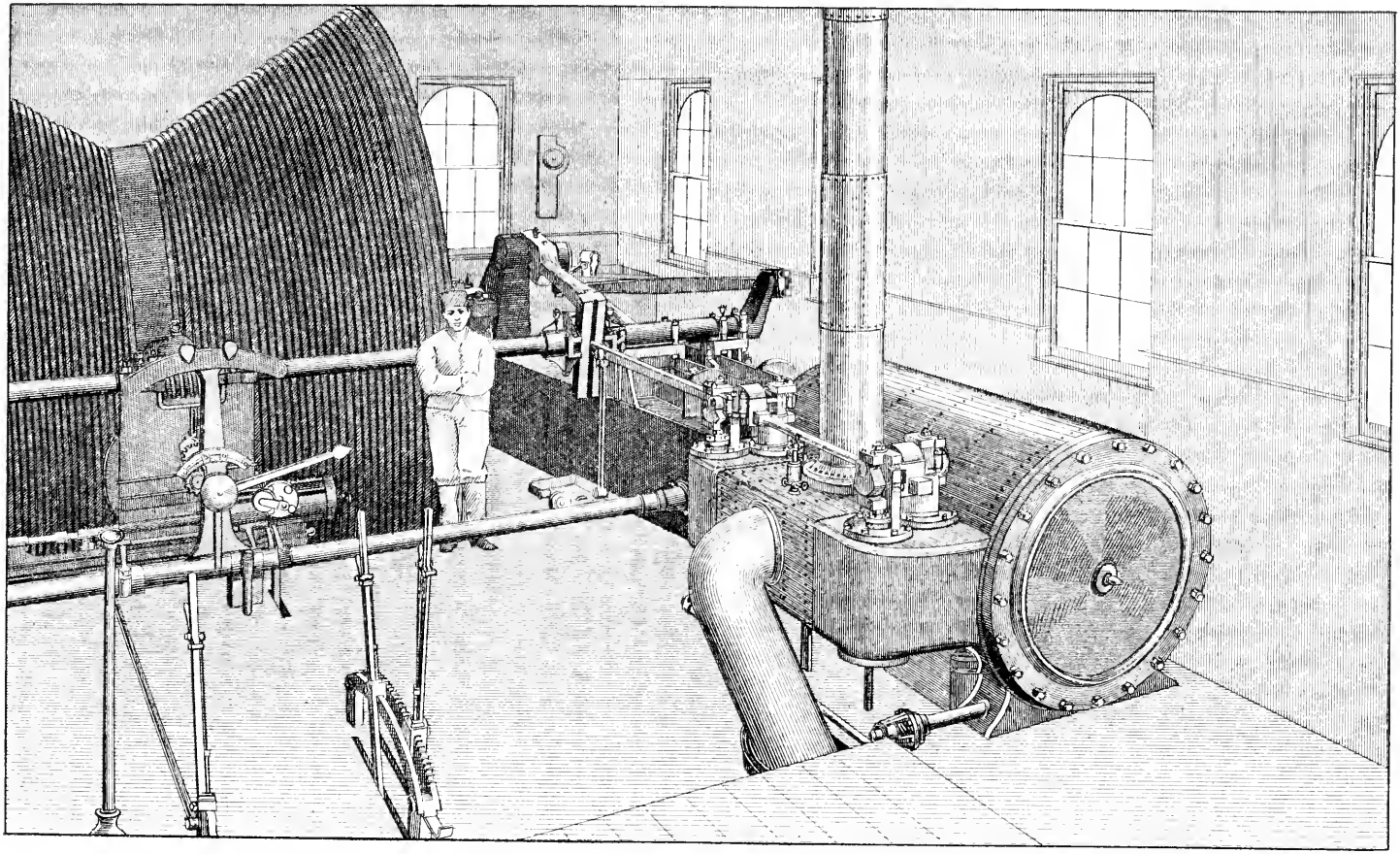
Hoisting Indicator and Signal.

This is also a piece of mechanism operated by the same shaft. There are two special features in the arrangement that require special notice, viz:

First. It is positive in its motion.

Second. The variation of the speed of the index finger in making its revolutions while the cages are passing through the body of the shaft. This index finger is two feet in length, and its extremity moves one inch for each stroke of the engines, but when the cages approach the top or landing, its speed increases and it moves one foot three inches during the last revolution of the drum.

In all other indicators that have come under my observation, whether working by direct gearing or by flexible chains or bands, their movement



MACHINERY AT "POTTSVILLE COLLIERY."

has only varied with the speed of the engines, and the distance traveled by the index finger depending upon the diameter of the circle of revolution. Hence, unless the circle was very large, the distance the finger would move per revolution would be so very small that the engineer might easily run his engine half a stroke too far without perceiving the distance the finger had traveled or moved. In that case with a drum, like that used at the Pottsville shafts, the cage would be raised over thirty feet, damaging property or perhaps resulting in the loss of life. But with such an indicator as the one previously described, a mistake of the nature could not easily happen, unless through negligence. Since, for one half of a turn of the drum, the index finger would move seven and a half inches.

As a safeguard against overwinding, in connection with the latter, another device is so arranged that the steam can be automatically cut off at any desired point upon the arrival of the cages at or near the top. At the same time a communication is opened between the main steam pipe and a fourteen-inch steam cylinder, fitted with a piston and other suitable gear, by which the valve is opened, the piston rod is connected direct to the lever of a powerful brake, which is applied to the middle of the drums, encircling within its grasp the main center or hub.

It is unnecessary to make any comments on the great importance of these mechanical contrivances, inasmuch as every practical and theoretical man is acquainted with the attending danger in hoisting men and minerals at high speeds out of deep and shallow shafts, and knows the great necessity of having such appliances, in connection with such winding gear as that above referred to.

As a special regulating gear to carry the ropes in front of the drums, two movable, regulating pulleys are placed, which move on inclined guide bars, at an angle corresponding to that of the drums, and are operated by a worm screw, by which the pulleys are adjusted to conform with the spiral grooves in the cones. This device is operated direct from the main shaft by level gearing, which is for the purpose of preventing the ropes from slipping from the larger sections of the cones.

The next notable feature in the plant of the colliery is the shaft frame, which is entirely of wrought iron, with the exception of the pillow blocks, in which the pulley shafts revolve, and the foot blocks, in which the main columns, four in number, are secured and held in position by foundation bolts weighed down with masonry.

The columns are hollow and cylindrical in shape each consisting of four segments, flanged and riveted together. The structure is fifty feet high from the top of the shaft, to the center of the pulley wheels. These wheels are sixteen feet in diameter, and are of the wrought-iron arm type.

The ropes are one and three fourth inches in diameter, and are manufactured from crucible steel. The ends which connect with the cages are fitted with safety detaching hooks and the cages, in their turn, with safety catches.

NOTE.—The breaking strain of these ropes were warranted to be three hundred thousand pounds.

The catches or keps on which the cages rest, while the loaded cars are being removed from them and replacing them with empty ones, are of a new design, of the telescope pattern, the outside shells or cylinders of which are fitted with spiral springs within, on which the sliding legs or catches rest, which are used to intercept the cages. This plan was adopted to lessen the shock that cages are generally subjected to in the old methods in use.

The ventilation is produced by an eighteen-foot fan of the Guibal type, driven by a vertical, direct-acting engine, its cylinder being sixteen by eighteen inches.

One pair of air compressors are in place; but these at the present time are only used to furnish blast to the smiths' fires. But suitable connections are made with a line of four-inch pipes running down the shaft, and have already rendered much service in supplying air for boring machines, in sinking shafts, and driving tunnels. And should it be necessary at any time in the future to do similar work, or sink inside slopes, these engines are on hand to supply the motive power.

The steam boilers are thirty-eight in number. Twenty-four of these are of the double type system, *i. e.*, two boilers placed one over the other. These boilers are thirty-six and forty inches in diameter, and twenty-two and one half and twenty-five feet long, respectively.

Considering the whole, we may venture to say, that this is the most powerful and complete outfit that has as yet been erected at any colliery in the United States, and we doubt whether there is elsewhere another which is superior to it.

ACCIDENTS.

The following is a description of the fatal accidents which occurred in the district during the year, resulting from the various causes, together with their classification under their proper heads, with such remarks relating to this subject that are of any importance:

Accidents from Falls of Roof.

Accidents resulting from falls of roof, coal, and sides, the first under this head, and number seven on the list, was that of James Symons, a miner, who was one of the men that had a contract to make a gravity plane in the Pottsville colliery. He was so severely injured, on June 7, by a fall of clod that he died seven days afterward. This clod, or friable slate, is interposed between the top of the vein and the main top. It is of a very treacherous character, and generally falls as the coal is removed from under it. At the point where the accident occurred it appears to have been a little stronger than usual, so much so that from four to five feet of it were hanging back from the face. The men working with the deceased at the time testified that just before the fall took place they had tried to pry it down with bars. However, they were unable to do so, and concluded that it would require

a shot. With this assurance, Symons commenced to work again under the clod, when it fell upon him, with the above mentioned result. Symons and those engaged with him were well acquainted with the dangerous nature of the clod, yet he ran the risk and lost his life, when a temporary prop five feet long would have prevented it. There is no doubt that they were aware that it was unsafe, since they tried to pull it down.

Accident No. 10.—Clemont Gregory, a miner, aged sixty years, was killed at Beechwood colliery by a fall of roof in his breast. The roof was of a very dangerous character, it being nearly flat, and from fifteen to eighteen feet in height, with very poor top. In places of this description the workman has no security whatever, and must depend upon the sense of hearing, which, in many instances, is of little use, as the falls often suddenly occur without giving any warning.

Accident No. 11.—Cornelius Calahan, a miner, aged forty-five years, was killed at Eagle Hill colliery by a fall of coal. This occurred July 23, and was the result of his own carelessness, as the following facts, given by his partner at the inquest, will show. He testified that a prop had been placed under the piece that fell, and that a short time previous to the accident a shot had been fired, and on returning to the place afterwards they found that the prop had been knocked out by a piece of coal. He further stated that he told Calahan that it was not safe to do any more work under it unless the prop was replaced, but the deceased said they would load one more buggy—a small car—and then quit for the day; adding that it would fall before they would return. However, the buggy, which did not contain over one thousand pounds, was but half loaded when the piece fell, crushing its victim beneath it.

Accident No. 12.—James McCullion, a miner, age thirty-five years, was so seriously injured at the Pottsville colliery, September 19, by a fall of coal in the Diamond vein, that he died the same day.

Accident No. 16.—James Carroll, a miner, age thirty-two years, lost his life by a piece of slate falling on him, December 3, at Eagle colliery. This accident requires no special remarks, inasmuch as it would only be a repetition of what has already been said.

Accidents by Cars.

Accident No. 8.—John Brennan, driver, age sixteen years, was killed at East Franklin colliery on June 11. His head being crushed between face of tunnel and bumper of a car. How the boy came to be caught in such a manner we are unable to say, as no one saw him at the time of the accident. The tunnel is located at the head of an inside slope, having a back switch laid in it, and having nearly sufficient grade for the car to run back on to the cage by gravity. The deceased was employed in hauling the cars in with a mule, which was generally unhitched from the car when about twelve feet from the face.

Accident No. 9.—At New Boston colliery, June —, Frank Nause, laborer, age twenty-two years, was crushed to death between a car and side of

gangway. The deceased was employed as a car runner, whose duty was to run the cars out of the different breasts as they were loaded by the miners. In consequence of those places being driven at an angle varying from five to seven degrees, it became necessary to regulate the speed. In order to accomplish this, it was necessary to have recourse to the common mode of spragging, which was the chief part of the labor which the deceased had to perform. The point where the accident occurred was at the junction of the road, under notice, with another. In place of a frog or center casting, a latch or cross rail was used. Hence it became necessary to change its position whenever cars had to be run down from different breasts, which was also a duty imposed upon Nause. This time he failed to perform this duty, and when the car arrived at the crossing it left the track, the hind end swinging around against the high side, crushing the unfortunate victim between it and the rib. It appears from the evidence that he generally rode down the grades, in order to remove or put in additional sprags, as the circumstances required, and it is very probable that he was in this position when he was caught.

ACCIDENT No. 14.—Ochsenreider, miner, age forty-five years, was killed at Lincoln colliery, on October 21, by being caught between a platform in the gangway and the back of a car, in which he, with several others, were riding to their respective working places. These chutes or platforms, at different places along the gangway, stood higher than the car, and projected from six inches to a foot over the side. The deceased, with the rest of the men, had been seated on the bottom of the car until they arrived near the place of accident. Here the mules were stopped, in order to detach some of the cars, before proceeding with the balance of the trip. The driver shouted to those in and about the cars to "look out." Ochsenreider, during the stop, had risen to his feet, with his back toward the driver, joking with some of the men. He was about to leave at this place. Whether he heard the warning given, or not, we cannot say. However, when the chute was reached the man was caught in the manner before stated.

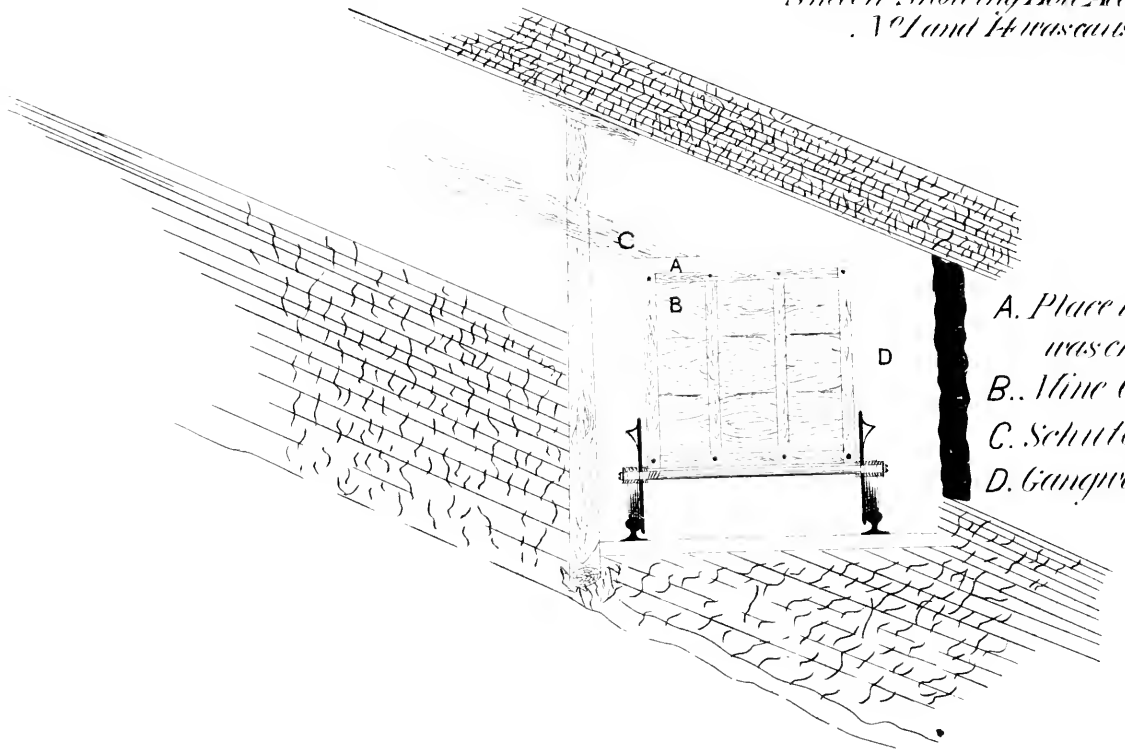
Inasmuch as there have been quite a number of accidents resulting from this cause at different periods, and as this is the second case in this colliery during the year, it will be seen, by examining sketch No. 4, that chutes put up in this manner are highly dangerous, and should be discontinued.

The number of accidents resulting from this cause should be quite sufficient in itself to condemn them, notwithstanding all that may be said in reference to dollars and cents.

ACCIDENT No. 1.—Edward Sommers, driver, fifteen years old, was killed at Lincoln colliery, February 3, by being crushed between a mine car and a chute.

ACCIDENT No. 17.—Morgan Jones, driver, age twenty-two years, was run over and killed by a trip of loaded cars, which he was bringing out of the gangway. This is another of those mysterious accidents in which no clue could be found to base an opinion as to the cause. He had been seen, on

Sketch Showing How Accident No 1 and 14 was caused



A. Place where victims was crushed

B.. Mine Car

C. Schute

D. Gangway

several occasions previous to the accident, riding out of the gangway sitting on the bumpers of the car, sliding his feet along the rail. It is the supposition of the inside foreman, and others working in the colliery, that his death resulted from this reckless mode of riding. He had been cautioned against this several times.

Accidents by Explosions of Gas.

ACCIDENT No. 2.—James Develin, miner, age twenty-five years, was instantly killed, at Eagle Hill colliery, on March 1, by an explosion of fire damp in a breast in the mammoth vein, which, particularly at this place, is about forty (40) feet thick, the coal being very free and jointy, and standing on an angle of 37°. Owing to this state of things, the top part fell, or what is technically termed in mining phraseology, running ahead of the bottom part of the vein, rendering it very difficult to conduct a sufficient quantity of air up to the highest point to dilute and carry away the gas as rapidly as it was "given off," hence there was always more or less standing, which could only be reached by hanging the safety lamp on the end of a long pole or rod kept for that purpose.

On the morning of the accident the deceased and his two partners met the fire boss, who notified them that there was gas in the breast, at the same time telling them to be careful and confine themselves to safety lamps; with this knowledge of the danger they entered their working place and commenced as usual to fill the chutes with coal. Nothing unusual happened until sometime in the afternoon, when the top part of the vein began working or to give signs that a fall was about to take place. The three men left the face, two of them (Develin being one) going down the middle of the breast about one hundred feet and there sat on the gob. The other placed himself in the upper cross-heading next to the face, waiting till the fall should occur, they had not long to wait, for shortly after reaching their various places of safety a heavy fall took place, sweeping the gas before it and down to where the two men were sitting, surprising to say, with open lights, thereby igniting it. Develin was blown through the chute, where a battery had stood previous to the explosion. At the head of the chute, thirty-six feet above the gangway, a set of couplings were also blown out. The loose coal which had been supported by them fell upon Develin, burying him completely, and crushing him to death. Fortunately the other two escaped without sustaining any injury, and strange to say not one of them was burnt.

This is one of the many occurrences so often referred to in these reports, but they are hardly worthy of the name accidents.

Had not those men been fully aware of the danger, perhaps it would be credited to ignorance; but it cannot be charged to the latter, for they had been warned by the working of the coal before the fall took place, also by the fire boss, that there was gas in the place. They themselves, who escaped, testified that they had made an examination and found gas. All three of them were practical miners who had worked in the vein and col-

liery for many years, and they stated at the inquest that they expected the fall to displace the gas. Their only excuse was that they did not think it would be driven down so far as the point where they were sitting with the open lights. Had they followed the dictates that their own practical experience must have suggested to them, *i. e.*, to quench the open lights, and confine themselves to the light of their safety lamp, the explosion might have been avoided. However, the safest plan would have been for them to leave their working place and not sit there through idle curiosity to see whether the fall would be large or small. It was unnecessary, for they were fully aware that they had much more coal ready in the chute than could be loaded that day; and had this not been the case, it was the height of folly for them to risk their lives for the sake of getting out another wagon of coal, which, perhaps, would add about twenty cents to each man's earnings.

Accidents by Machinery.

ACCIDENT No. 5.—George Slattery, a slate picker, age sixteen years, employed in No. 11 breaker, owned and operated by the Lehigh Coal and Navigation Company, was killed on the 30th of March. His coat was caught by the head of a set-screw, that secured a collar to a shaft, for the purpose of preventing a side vibration. It, therefore, revolved in close proximity to one of the pillow blocks that supported the shaft. The part of the breaker, where the accident occurred, was not intended to be occupied by the employés; but, form the evidence taken at the coroners's inquest, it appears that one of the coal chutes or conductor that passes under the shaft had not sufficient pitch to carry the coal by its own gravity. At times, therefore, it became the duty of some of the employés to go to this part of the building to start the coal when it became blocked. This duty the boy had been sent to perform, when he met his death. The fatal set-screw projected about one and a half inches from the collar, and revolved about one hundred times per minute. There was nothing in the testimony given to show how the boy was caught, as no one saw it, but it is my opinion that he was standing with his back against the shaft, starting the coal with his foot, when his coat became entagled with the revolving set-screw, holding him fast, at the same time whirling him around with every revolution. His body and his limbs were violently struck against the frame-work on which the machinery was supported, killing him instantly.

ACCIDENT No. 13.—Joseph Mettinger, laborer, age nineteen years, was killed in the breaker at New Boston colliery, September 24, while attempting to put on a belt that had slipped off a pulley. This accident would have been avoided, had he taken the proper course before attempting to replace it; that was, to notify the engineer to slack the speed of the engine, or to stop the machinery altogether. This he failed to do, either through ignorance or recklessness, but attempted to place the belt into its proper position while the machinery was running at its full speed, which was about one hundred revolutions per minute. In so doing, it is supposed, his hand

The boy, his father, and another man had been engaged in bailing water, and attending to emptying of the car as it was hoisted to the old water-level. On finishing their day's work, the boy entered the car, while the men stood on the front bumpers, preparatory to being hoisted up the slope. Such were there positions on arriving at the apex. The weight of the men over-balanced that of the boy and car, throwing the front part down, the bumpers coming in direct contact with the sills that supported the pulley-frame; brought the car to a sudden stand, breaking the rope a short distance from the socket or thimble. The car rushed down the slope, carrying its occupant with it, to be dashed to pieces at the bottom.

That this boy was a victim of recklessness cannot be doubted, since both of the men, in giving their testimony at the coroner's inquest, stated that they were fully aware that their weight would more than balance the car when they had reached the top, but that they intended to step off before reaching the critical point.

To provide against accidents of this character, an extra chain was attached to the rope, and orders given that whenever they rode up or down to suspend the car by this chain to the bottom hitching-plate. Had even this been done, it is very probable the accident would have been avoided, by reason of the rope being kept in a more direct line with the angle of the slope.

By falling down Shaft.

ACCIDENT No. 15.—Thomas Cochlin, miner; age, forty-five years; married; leaves three children. He met his death by falling off cage while descending the shaft. The cage in use is of the type generally used throughout the anthracite coal-region, and requires no special description. How the deceased came to fall from the cage we cannot determine. The general opinion is that it resulted either from a fit or rush of blood to the head.

Miscellaneous.

ACCIDENT No. 3.—James McGee, an outside laborer; age, sixty years; single. Was killed by a fall of clay on March 8, while engaged stripping the surface off the crop of a coal seam, at No. 8, Lehigh Coal and Navigation Company's colliery.

REGISTER OF FATAL CASUALTIES.

Date.	Names.	Occupation.	Name of Collieries.	Age.	Married or Single.	Children.	Remarks.
Feb. 3	Edward Summers,	Driver,	Lincoln,	15			Killed; caught between front end of wagon and chute.
Mar. 1	James Devlin,	Miner,	Eagle Hill,	25	Single,		Killed by explosion of gas.
8	James McGee,	Laborer,	Lehigh, No. 8,	60	Bachelor,		Fatally injured; bank of earth fell on him; died on the 9th.
15	Thomas Buggy,	Driver,	W. C. Diamond,	14			Killed by rope breaking in slope, caused by bumpers catching in roller-frame.
30	George Slatery,	Slate picker,	Lehigh, No. 11,	16			Killed; caught in machinery.
April 21	William Paul,	Miner,	East Franklin,	26	Single,		Killed by outburst of gas.
May 7	James Symonds,	Miner,	Pottsville,	35	Married,		Fatally injured; died May 14; fall of roof.
June 11	John Brennan,	Driver,	East Franklin,	14			Killed by mine cars.
	Frank Nause,	Car runner,	New Boston,	22	Married,	2	Killed by mine cars.
July 23	Clement Gregory,	Miner,	Beechwood,	60	Married,		Killed by fall of rock.
Sept. 17	Cornelius Calahan,	Miner,	Eagle,	45	Married,	5	Killed by a fall of coal.
19	James McCullion,	Miner,	Pottsville,	35	Married,	5	Killed by a fall of coal and slate.
24	Joseph Mettinger,	Laborer,	New Boston,	19	Single,		Killed by machinery.
Oct. 21	—— Ochsenreider,	Miner,	Lincoln,	45	Married,	6	Killed; caught between mine car and chute in gangway.
Nov. 9	Thomas Cochlin,	Miner,	Eagle Hill,	45	Married,	3	Killed; fell down shaft.
Dec. 3	James Carroll,	Miner,	Eagle,	32	Single,		Killed by fall of coal.
20	Morgan Jones,	Driver,	Wadesville,	22	Single,		Killed; run over by mine wagon.
19	Frank Dormer,	Miner,	Otto,	60	Married,		Fatally injured by explosion of gas; died some time afterward.

REGISTER OF NON-FATAL CASUALTIES.

DATE.		Names.	Occupation.	Name of the Collieries.	REMARKS.
Jan.	1	W. W. Leonard,	Miner,	Pottsville,	Back and side injured; fall of slate.
	11	Thomas Woodward,	Starter,	Mine Hill Gap,	Splinter of T rail run into his foot while on his way to work.
	13	Joseph Boden,	Miner,	Mine Hill Gap,	Hip injured; fall of coal.
	20	William Beadle,	Miner,	Pottsville,	Head cut and body bruised; fall of coal.
	31	Bart Linch,	Laborer,	Pottsville,	Head cut; fall of coal.
Feb.	5	Thomas Brennan,	Driver,	Ellsworth,	Head injured; caught between timber and wagon.
	8	Michael Hoben,	Miner,	Richardson,	Head and body cut; he fell into a chute.
	8	Michael Hintz,	Miner,	Colket,	Hip and side injured; fall of coal.
	19	Louis Morgan,	Driver,	Thomaston,	Finger cut off while coupling wagon.
	21	John Carney,	Miner,	Wadesville,	Back injured by a blast.
Mar.	1	Tim Carroll,	Miner,	Beechwood,	Rib broke; struck by a T rail.
	8	Dennis Sullivan,	Miner,	Beechwood,	Thigh broke; fall of coal.
	8	James McKenna,	Miner,	Lehigh, No. 8,	Leg injured; fall of coal.
	19	Michael Duffy,	Miner,	Pottsville,	Foot crushed; fall of slate.
	21	William Bailin,	Driver,	Thomaston,	Hip injured; caught between a prop and wagon.
	22	Edward Dando,	Miner,	Thomaston,	Rib broke; fell off chute.
April	6	Thomas T. Williams,	Miner,	Pottsville,	Face and hands burned; explosion of gas.
	7	Jesse Springer,	Laborer,	Lehigh, No. 11,	Leg broke; fall of coal.
	12	Peter Waters,	Slate picker,	Lehigh, No. 8,	Leg mashed; caught in machinery of breaker.
	12	Thomas Prosser,	Miner,	Lehigh, No. 11,	Face slightly burned; premature explosion of blast.
	12	John Erbe,	Miner,	Lehigh, No. 11,	Hands burned; premature explosion of blast.
	13	Casper Shutt,	Miner,	East Franklin,	Foot injured; fall of coal.
	15	George Tracy,	Miner,	Otto,	Body bruised; a prop fell on him.
	19	James O'Leary,	Miner,	Phœnix Park, No. 3,	Back injured; fall of coal.
	20	John Watters,	Miner,	Wadesville,	Eye injured; fall of coal.
	21	Michael Haverty,	Driver,	Pottsville,	Thigh bruised; kicked by a mule.
	28	James Hennisey,	Miner,	Colket,	Injured by explosion of gas, fired by shot.
	28	Patrick Keating,	Miner,	Colket,	Injured by explosion of gas, fired by shot.
	28	Thomas Montgomery,	Miner,	Pottsville,	Hand burned; explosion of gas.
	28	Thomas Evans,	Miner,	Mine Hill Gap,	Foot cut with ax while chopping a lagging.
	28	Peter Kurtz,	Loader,	Lehigh, No. 10,	Body injured; caught between chute and car.
	12	Mark Hodges,	Member of firm,	Dundas, No. 8,	Thigh broken while putting up timber in gangway.
May	4	William Evans,	Miner,	Colket,	Arm broke and face cut; fall of coal.
	9	Joseph Kline,	Miner,	Pine Forest,	Slightly burned; explosion of gas.
	11	John S. Evans,	Miner,	Glendower,	Leg injured; fall of top coal.
	18	Michael Corcoran,	Miner,	Eagle,	Leg broke; three fingers cut off, and otherwise injured by blast.
	18	Michael Mellody,	Fireman,	Pottsville,	Opening fire door, face badly burned.
	20	James McGloughlin,	Laborer,	Pottsville,	Foot mashed by cage.
	31	Patrick McGolick,	Driver,	Lehigh, No. 8,	Jammed between cars; knee injured.
June	1	James Delaney,	Laborer,	Richardson,	Back cut; fall of coal.
	3	Patrick Carney,	Tipman,	Beechwood,	Back injured; fell off tressling.
	6	John Foley,	Laborer,	Richardson,	Leg and side bruised; fall of coal.

June	8	Edward Connelly,	Driver,	Otto,	Leg injured by mine wagon.
	8	Henry Childs,	Miner,	Pottsville,	Back injured; fall of slate.
	11	John H. Brown,	Miner,	Thomaston,	Hands and arms burned; explosion of powder.
	15	Edward Quinn,	Driver,	Otto,	Ribs hurt; kicked by a mule.
	17	James B. Wood,	Miner,	Pine Forest,	Injured by explosion of gas.
	17	John Haslop,	Miner,	Pine Forest,	Injured by explosion of gas.
	18	Daniel Ratigan,	Miner,	Wadesville,	Back injured; fall of coal.
	24	Fred Sims,	Miner,	Rausch Creek,	Back injured; fall of coal.
July	1	John O'Brien, senior,	Miner,	Eagle,	Leg broke; fall of coal.
	1	Thomas Brown,	Driver,	Otto,	Leg broke while coupling wagons.
	2	Thomas Ward,	Miner,	Pine Forest,	Injured by explosion of gas.
	2	William Conner,	Miner,	Pine Forest,	Injured by explosion of gas.
	6	John Bergan,	Miner,	Thomaston,	Shoulder and breast injured; prop fell on him.
	7	Thomas Dougherty,	Miner,	Swatara,	Back injured; fall of coal.
	8	James McGowan,	Fire boss,	Eagle Hill,	Knee injured; fall of coal.
	14	Frank Richardson,	Driver,	Wadesville,	Leg bruised; run over by dumper.
	15	Martin Foyle,	Fan turner,	Richardson,	Injured internally; fell into cage hole at bottom of slope.
	16	James Blacker,	Miner,	Pottsville,	Back injured; fall of coal.
	19	——— James,	Miner,	W. C. Diamond,	Head and hands burned; explosion of gas.
	19	James Nash,	Miner,	Pine Forest,	Head and hands burned; explosion of gas.
	19	Joseph Boden,	Miner,	Glendower,	Hip and legs bruised; fall of coal.
	29	Wesley Shanfstall,	Miner,	Colket,	Thigh injured; fall of coal.
	21	William Hertin,	Miner,	Pine Forest,	Head and hips injured; fall of coal.
	22	John Mulroy,	Miner,	Wadesville,	Shoulder injured; fall of slate.
	23	John S. McDonald,	Foreman,	Lehigh, No. 10,	Leg broke; caught in gangway by cars.
	30	William Scott,	Driver,	Lehigh, No. 10,	Leg bruised by empty cars.
Aug.	2	John F. Welsh,	Miner,	Phœnix Park, No. 2,	Seriously burned; explosion of gas.
	2	James Brown,	Repairman,	Phœnix Park, No. 2,	Seriously burned; explosion of gas.
	2	Michael Moore,	Repairman,	Phœnix Park, No. 2,	Seriously burned; explosion of gas.
	2	Edward Brady,	Miner,	Phœnix Park, No. 2,	Seriously burned; explosion of gas.
	2	Phenis Whetstone,	Fireman,	Lehigh, No. 10,	Leg hurt; fell into car pocket.
	4	John Melody,	Minor,	Eagle,	Fall of coal.
	5	Thomas Purcell,	P. man,	Phœnix Park, No. 3,	Head and body bruised; struck by wagon.
	5	Henry Slouch,	Miner,	Rauch Creek,	Badly bruised; fall of slate.
	9	James Dempsey,	Repairman,	Richardson,	Explosion of gas.
	9	John Ryan,	Starter,	Richardson,	Head cut, arms and back injured; fall of coal.
	12	Jonathan Rienvehl,	Boss,	Colket,	Hips injured, and burned about body; explosion of gas.
	12	Peter Greiger,	Miner,	Colket,	Burned; explosion of gas.
	12	George Novcrocker,	Miner,	Colket,	Burned; explosion of gas.
	12	William Brannon,	Fire boss,	Colket,	Burned; explosion of gas.
	18	John Moran,	Miner,	Otto,	Arm and body injured by shot.
	19	William Beadle,	Miner,	Pine Forest,	Explosion of gas.
	25	Joseph Herst,	Miner,	Wadesville,	Face and hands burned; explosion of gas.
	25	Edward Evans,	Miner,	Wadesville,	Face and hands burned; explosion of gas.
	26	John O'Brien,	Bottomman,	Glendower,	Leg injured; caught in speader chain.
Sept.	1	Thomas Crookson,	Driver,	Eagle,	Slightly.
	2	Mathew Kelly,	Laborer,	Mine Hill Gap,	Explosion of gas.
	2	Michael Rielly,	Miner,	Otto,	Squeezed about body and hips.
	5	Thomas Dunlap,	Miuor,	Eagle,	Hip knocked out of joint; fall of coal.
	5	Benjamin Prosser,	Loader,	Greenwood,	Face and hands burned; explosion of gas.
	5	Michael Schymelphinie,	Loader,	Greenwood,	Face and hands burned; explosion of gas.
	5	Lag Camplon,	Miner,	Thomaston,	Back injured; fall of coal.
	6	Condy Rodgers,	Driver,	Lehigh, No. 10,	Collar bone broken; fell off of mule.

REGISTER OF NON-FATAL CASUALTIES—*Continued.*

DATE.	Names.	Occupation.	Name of the Collieries.	REMARKS.
Sept. 6	Arkey Foster,	Loader,	Lehigh, No. 11,	Wrist dislocated; tried to stop a car.
7	Edward Bell,	Laborer,	Thomaston,	Finger cut while unloading a wagon.
7	Daniel Lyons,	Miner,	Lincoln,	Foot injured while getting off of wagon.
8	Thomas Kelly,	Driver,	Mine Hill Gap,	Head injured; fell under wagon.
8	Edward Adams,	Tman,	Swatara,	Toe mashed; run over by loaded cars.
8	Supton Hodgson,	Miner,	Pine Forest,	Leg hurt; struck by piece of coal.
8	William Bensinger,	Door-boy,	Lincoln,	Two ribs fractured; fell under loaded wagon.
9	— —,	Miner,	Dundee, No. 7,	Injured by shot from next breast.
14	Adam Panless,	Miner,	Wadesville,	Head and hand cut; fall of coal.
14	Charles Melligan,	Miner,	Beechwood,	Back injured; fall of coal.
15	William Williams,	Miner,	Richardson,	Ankle injured; fall of coal.
20	Thomas Brennan,	Miner,	Thomaston,	Foot injured; fall of coal.
20	William Moore,	Miner,	Wadesville,	Back injured and wrist cut; fall of slate.
22	Edward Muldowney,	Laborer,	Mine Hill Gap,	Back injured; fall of coal.
22	James Flemming,	Starter,	Colket,	Face injured and part of hand cut off.
22	Richard Quinn,	Starter,	Mine Hill Gap,	Back injured; fall of coal.
23	John Lambert,	Door-boy,	Wadesville,	Leg and back injured; fall of slate.
23	Joseph Kilsham,	Miner,	Wadesville,	Leg injured; mule kicked him.
23	Charles Spane,	Slate-picker,	Lehigh, No. 11,	Part of first finger cut off; fall of coal.
26	David Hammer,	Miner,	Richardson,	Ribs broken; fall of coal.
Oct. 5	Michael Conners,	Miner,	Pine Forest,	Explosion of gas.
8	Thomas Thomas,	Miner,	Otto,	Hands burned; explosion of gas.
12	Farrell Donnelly,	Miner,	Beechwood,	Hands and face burned; explosion of gas.
12	John Conners,	Laborer,	Beechwood,	Hands burned; explosion of gas.
12	James McHugh,	Starter,	Mine Hill Gap,	Back injured; fall of coal.
17	Edward Kramer,	Miner,	Colket,	Back and hip injured; fall of coal.
17	John Kelly, No. 1,	Miner,	Richardson,	Back injured; fall of coal.
18	Thomas Carr,	Miner,	Colket,	Slightly burned; explosion of gas.
18	Edward Lawlor,	Miner,	Colket,	Slightly burned; explosion of gas.
21	Henry Childs,	Laborer,	Pottsville,	Head and shoulders bruised; fall of slate.
27	Jerry Coyn,	Driver,	Colket,	Head and face injured; caught between wagon and chute.
27	Thomas Prim,	Driver,	Lehigh, No. 11,	Knee injured; caught between wagons.
31	William Frankenstein,	Miner,	Beechwood,	Back injured; fall of coal.
Nov. 1	John McLoughlin,	Loader,	Wadesville,	Rib broken; fell on a wagon.
8	George Buehler,	Miner,	Black Mine,	Slightly injured; fall of coal.
9	Samuel Allen,	Miner,	Thomaston,	Face injured; fall of coal.
9	John Malley,	Miner,	Thomaston,	Leg injured; fall of coal.
10	Daniel Hoy,	Miner,	East Franklin,	Back injured; fall of coal.
11	Jacob Homman,	Driver,	Lehigh, No. 10,	Body injured; run over by dirt-truck.
12	John McGuire,	Miner,	Phœnix Park, No. 3,	Leg injured; fall of coal.
14	Martin Hanney,	Miner,	Pottsville,	Foot and ankle injured; fall of coal.
14	John Shanningham,	Starter,	Mine Hill Gap,	Burned with powder while tamping a hole.
17	Nicholas Bratz,	Bottom-man,	Rausch Creek,	Head injured; caught between two wagons.
22	John Jones,	Laborer,	Pine Forest,	Back injured; door of wagon fell on him.
23	Evan Evans,	Driver,	Beechwood,	Leg injured; fell under wagon.
24	Eli Fielding,	Miner,	Wadesville,	Back injured; fall of coal.

26	Solomon Bixler,	Tman,	Colket,	Leg injured; fell under wagon.
30	John N. Ryan,	Miner,	Mine Hill Gap,	Eye injured; struck by piece of coal.
Dec. 1	Thomas Brown,	Driver,	Otto,	Foot injured; caught between wagon and top slate.
2	John Garrity,	Driver,	Pine Forest,	Shoulders injured; caught between wagon and timber.
3	Frank Haugler,	Driver,	Lehigh, No. 11,	Slightly injured; caught between two wagons.
6	Patrick Casey,	Miner,	Otto,	Back injured; fall of coal.
13	Walter Leonard,	Miner,	Mine Hill Gap,	Foot injured; fall of coal.
13	Walter Kirby,	Driver,	Pine Forest,	Arm broken; caught between top of car and collar.
13	James Canfield,	Laborer,	Mine Hill Gap,	Head injured; fall of coal.
13	Patrick McGarry,	Laborer,	Mine Hill Gap,	Back injured; struck by a piece of coal.
14	Charles Murray,	Inside foreman,	Eagle Hill,	Hip injured; spreader chain struck him.
14	Robert Jefferson,	Bottom-man,	Mine Hill Gap,	Leg injured; caught by wagon while uncoupling.
15	Albert Deitrick,	Miner,	Swatara,	Back injured; fall of coal.
15	Barney Larkin,	Miner,	Otto,	Hands burned; explosion of gas.
17	James Gallagher,	Driver,	Glendower,	Toe mashed; run over by dumper.
19	John Work,	Miner,	Lehigh, No. 10,	Slightly injured; fall of coal.
19	Thomas McGovern,	Miner,	Otto,	Hip injured,
19	Patrick Kilbain,	Miner,	Otto,	Face cut and hands bruised,
19	Robert Dunlap,	Miner,	Otto,	Bruised and hands burned,
19	William Kelley,	Miner,	Otto,	Slightly injured,
19	David Dunlap,	Miner,	Otto,	Knocked down chute,
19	Michael Cavanaugh,	Miner,	Otto,	Knocked down chute,
19	Henry Gottshall, junior,	Miner,	Otto,	Bruised and leg injured,
19	Thomas Malley,	Miner,	Otto,	Face and hands burned,
20	George Parcell,	Laborer,	Mine Hill Gap,	Back injured; struck by piece of coal from shot.
22	William Warren,	Miner,	Pottsville,	Hand bruised; struck by sledge.
23	Daniel Kelley,	Miner,	Beechwood,	Face and hands cut; fall of coal.
23	Richard Hughes,	Miner,	Thomaston,	Finger cut off while laying sheet-iron in breast.
24	Edward Evans,	Miner,	Pine Forest,	Hip cut; struck by piece of coal.
28	William Dalard,	Starter,	Richardson,	Hand badly shattered by explosion of powder.
28	Patrick Hanney,	Miner,	Pottsville,	Hand cut; struck by piece of coal.
30	William Kays,	Slate-picker,	Lehigh, No. 10,	Top of finger cut off by jigs.

RECAPITULATION OF FATAL CASUALTIES.

Explosion of gas,	2
Falls of coal, slate, &c.,	6
Mine cars and machinery,	7
Miscellaneous,	3
Total,	18

RECAPITULATION OF NON-FATAL CASUALTIES.

Explosion of gas,	41
Explosions of powder and blasts,	10
Fall of coal, slate, &c.,	68
Mine cars and machinery,	36
Miscellaneous,	18
Total,	173

Of the above non-fatal accidents, sixteen had bones fractured, as follows, viz:

Ribs fractured,	5
Thighs fractured,	2
Legs fractured,	5
Arm fractured,	1
Dislocations,	2
Collar bones fractured	1
Total,	16

COMPARATIVE STATEMENT OF CASUALTIES, TONNAGE, AND EMPLOYEES FOR TWO YEARS IN FIRST OR POTTSVILLE DIVISION OF MINING DISTRICT OF SCHUYLKILL.

YEARS.	Killed.	Injured.	Total.	Total number employés.	Number employés to each casualty.	Total number tons coal mined.	Number tons of coal mined to each fatal casualty.	Number tons of coal mined to each non-fatal casualty.	Ratio of tons of coal mined to casualties.	Number tons of coal to each employé.
1880, ...	15	129	144	6,913	$53\frac{1}{2}$	1,461,070.17	97,404.14	11,326.02	10,146.06	211.07
1881, ...	18	173	191	6,497	$34\frac{3}{191}$	1,829,656.06	101,647.11	10,516	9,579.06	281.10
Total, ...	33	302	335	. . . .	. . . . .	3,290,727.03				
Average, . . .	$16\frac{1}{2}$	151	$167\frac{1}{2}$	6,705	$44\frac{1}{3}$	1,645,363.10	99,526.02	10,921.01	9,863.06	246.08

NUMBER EMPLOYEES, COAL MINED, DAYS WORKED, &c., FOR YEAR ENDING DECEMBER 31, 1881.

Collieries.	Operators.	Number of Employees.			Number of kegs of powder used.	Number of days worked.	Number of persons killed.	Number of persons injured.	Number of tons coal shipped.
		Inside.	Outside.	Total.					
New Kirk,	Philadelphia and Reading Coal and Iron Company,	. . . .	1	1					
Buckville,	do. do.	. . . .	2	2					
Eagle Hill,	do. do.	141	109	250	1,020	227$\frac{1}{2}$	2	2	70,084.12
Pine Forest,	do. do.	150	78	228	1,025	160	. .	14	41,549.12
Wadesville,	do. do.	357	129	186	1,430	228$\frac{1}{2}$	1	13	110,874.08
Beechwood,	do. do.	122	59	181	885	171$\frac{1}{2}$	1	9	39,706.17
Pottsville,	do. do.	114	71	185	425	173$\frac{3}{4}$	2	15	16,478.08
Pine Knob,	do. do.	. . . .	2	2					
Anchor,	do. do.	. . . .	2	2					
Mine Hill Gap,	do. do.	195	120	315	1,050	186	. . . .	15	48,902.09
Thomaston,	do. do.	152	131	283	2,770	201$\frac{1}{2}$	. . . .	10	82,975.19
Richardson,	do. do.	138	108	246	1,095	180	. . . .	10	58,388.16
Glendower,	do. do.	128	79	207	845	206	. . . .	4	51,465.18
Forestville,	do. do.	. . . .	2	2	75	. . . .	. . . .	. . . .	7.00
Phœnix Park, No. 2,	do. do.	84	54	138	790	220$\frac{3}{4}$	. . . .	4	33,011.00
Phœnix Park, No. 3,	do. do.	83	46	129	705	185$\frac{1}{2}$	. . . .	3	22,163.01
Otto,	do. do.	154	89	243	935	179	1	18	55,905.05
Swatara,	do. do.	71	61	132	1,125	231$\frac{1}{2}$	. . . .	3	53,124.04
Middle Creek Shaft,	do. do.	. . . .	2	2	. . . .	. . . .	. . . .	. . . .	2.00
East Franklin,	do. do.	67	53	120	105	166$\frac{1}{4}$	2	2	19,179.07
Colket,	do. do.	93	73	166	965	230	. . . .	15	43,221.15
		. . . .	. . . .	†136	. . .	199			
Black Heath,	William H. Harris,	. . . .	. . . .	80	680	180	. . . .	. . . .	21,132.02
Ellsworth,	John R. Davis,	14	12	26	240	224	. . . .	1	11,933.02
Eagle,	George W. Johns & Bro.,	100	45	145	1,687	211$\frac{1}{4}$	2	5	49,361.19
Kalmia,	Phillips & Shaefer,	197	76	273	2,295	225	. . . .	. . . .	83,167.00
Lincoln,	Levi Miller & Co.,	262	152	414	4,400	258	2	2	146,899.17
Rausch Creek,	Miller, Graeff & Co.,	194	110	304	500	230$\frac{1}{2}$	. .	3	85,382.03
Lehigh, No. 8,	Lehigh Coal and Navigation Company,	275	170	445	780	246$\frac{3}{4}$	1	3	140,365.11
Lehigh, No. 10,	do. do.	166	120	286	1,200	190$\frac{1}{8}$	. . . .	8	86,463.04
Lehigh, No. 11,	do. do.	153	104	257	1,820	206$\frac{3}{4}$	1	7	81,525.10
Palmer Vein,	Alliance Coal Company,	. . . .	. . . .	200	. . .	142	. . . .	. . . .	28,000.00
St. Clair,	Joseph Atkinson,	8	6	14	17	204	. . . .	. . . .	3,524.17
Sharpe Mountain,	Thomas Wren,	7	7	14	24	274	. . . .	. . . .	2,540 00
Black Mine,	J. D. Crutz Crook,	56	32	88	500	185	. . .	1	16,357.04
West Lehigh,	Wood & Pearce,	21	35	56	210	200	. . . .	. . . .	16,500.00
Greenwood,	Raabe & Fey,	5	11	16	90	256	. . . .	2	2,776.00
New Boston,	Lehigh Coal Company,	195	139	334	3,310	226$\frac{1}{4}$	2	. . . .	153,924.11

East Lehigh,	Mitchel & Symonds,	11	17	28	31	252			10,116.08
Pine Dale,	Louis Lorenz,	22	13	35	250	200			6,600.00
Repplier,	J. F. Quinn,	9	7	16	75	254			3,106.18
Mammoth,	Mahaney & Co.,	5	3	8	50	250			750.00
W. C. Big Diamond,	James F. Donohoe,	23	13	36	300	215		1	8,000.00
Peach Orchard,	John Denning,	5	3	8	45	190			1,362.07
Jugular,	John S. Hepner,	2	2	4	14	288			869.04
Woods,	George S. Wood, agent,	4	3	7	5	162			1,054.12
Monitor,	John Denning,	5	5	10	120	190			1,854.07
Garfield,	Tim Cockhill & Co.,	3	2	5		30			252.04
Peach Orchard,	Thomas Burke,			1	1	30			235.00
W. C. Diamond,	E. Thomas,	13	8	21		225	1	1	5,058.18
Dundas, No. 7,	Davis & Co.,			35				2	5,000.00
	Theo. Hellman,			4	72				637.11
Black Valley,	Edward Hoskins,	5	2	7	12	200			1,942.16
Swatara,	John D. Felty,								1,046.05
Lewis Tract,	Seth W. Greer,								207.18
Chandler Tract,	Patrick Keenan,								100.00
Chandler Tract,	William Lloyd,								9.10
Keim & Repp,	Samuel B. Myers,								165.00
W. C. Diamond,	John W. Davis,								566.18
St. Clair Tract,	John Wylaan,								129.00
Tremont,	Boder & Laux,								131.05
		3,809	2,368	6,497	33,493	* 202½	18	173	1,726,089.12
Consumed or sold at colliery,									103,566.14
Total produced,									1,829,656.06

* Average.

† Report received after tables were completed.

NAMES OF COLLIERIES IN OPERATION AND COAL MINED IN POTTSVILLE DIVISION OF SCHUYLKILL DISTRICT FOR YEARS 1880-81.

NAMES OF THE COLLIERIES.	Location of Collieries.	Names of Operators.	1880.	1881.
Beechwood,	Mt. Laffee,	Philadelphia & Reading Coal and Iron Company,	45,078.05	39,706.17
Colket,	Donaldson,	do. do.	25,481.08	43,221.15
East Franklin,	Upper Rausch Creek,	do. do.	34,418.18	19,179.07
Eagle Hill,	New Philadelphia,	do. do.	56,427.16	70,084.12
Glendower,	Glen Carbon,	do. do.	25,738.19	51,465.18
Mine Hill Gap,	Minersville,	do. do.	35,028.18	48,902.09
Otto,	Branchdale,	do. do.	35,639.09	55,905.05
Phœnix Park, No. 2,	Phœnix Park,	do. do.	23,468.11	33,011.00
Phœnix Park, No. 3,	Phœnix Park,	do. do.	18,771.01	22,163.01
Pine Forest,	St. Clair,	do. do.	33,050.11	41,549.12
Pottsville,	Pottsville,	do. do.	39,062.10	16,478.08
Richardson,	Glen Carbon,	do. do.	70,773.14	58,388.16
Thomaston,	Hecksherville,	do. do.	77,186.03	82,975.19
Swatara,	Swatara,	do. do.	21,463.18	53,124.04
Wadesville,	Wadesville,	do. do.	106,388.00	110,874.08
Black Heath,	Minersville,	William Harris,	26,883.09	21,132.02
Chandler,	Minersville,	Patrick Keenan,	426.05	100.00
Ellsworth,	New Castle,	John R. Davis,	10,126.13	11,933.02
Eagle,	St. Clair,	George W. Johns & Bro.,	41,466.14	49,361.19
Jugular,	New Castle,	Jacob S. Hepner,	895.07	869.04
Gate Vein,	Pottsville,	Gate Vein Coal Company,	395.17	
Kalmia,	Orwin,	Phillips & Shaeffer,	76,026 16	83,167.00
Lincoln,	Tremont township,	Levi Miller & Co.,	125,170.08	146,899.17
Rausch Creek,	Tremont township,	Miller, Graeff & Co.,	82,608.19	85,382.03
Lewis Tract,	Minersville,	Seth W. Geer,	773.07	207.18
Lehigh, No. 8,	Coal Dale,	Lehigh Coal and Navigation Company,	96,145.12	140,365.11
Lehigh, No. 10,	Coal Dale,	Lehigh Coal and Navigation Company,	91,509.01	86,463.04
Lehigh, No. 11,	Coal Dale,	Lehigh Coal and Navigation Co mpany,	40,806.05	81,525.10
Palmer Vein,	New Philadelphia,	Alliance Coal Company,	23,772.00	28,000.00
St. Clair,	St. Clair,	Joseph Atkinson,	2,253.13	3,524.17
Sharpe Mountain,	Pottsville,	Thomas Wren,	3,913.15	2,540.00
W. C. Diamond,	Minersville,	E. Thomas,	5,060.11	5,058.18
Swatara,	Swatara,	John D. Felty,	719.00	1,046.05
Chandler Tract,	Minersville,	William Lloyd,	60.00	9.10
Monitor,	Wadesville,	John H. Denning,	2,585.04	1,854.07
Peach Orchard,	St. Clair,	John H. Denning,	1,743.15	1,362.07
St. Clair,	St. Clair,	Thomas Burke,	294.13	235.00
Greenwood,	Tamaqua,	Raabe & Fey,	1,306.06	2,776.00
West Lehigh,	Tamaqua,	Wood & Pearce,	14,357,10	16,500.00
Black Mine,	Llewellyn,	J. D. Curtz Crook,	1,259.15	16,357.04
Tremont Lands,	Tremont,	Peter Laux,	402.15	131.05
Whippoorwill,		John Wylam,	239.00	129.00

Black Valley,	Minersville,	Theodore Hellman,	323.00	637.11
W. C. Big Diamond,	Wolf Creek,	Edward Hosklus,	1,710.03	1,942.16
New Boston,	New Boston,	James F. Donahoe,	5,005.01	8,000.00
Hiawatha,	Middleport,	Lehigh Coal Company,	47,601.00	153,924.11
Middleport,	Middleport,	S. Kestenbaek,	150.00	
East Lehigh,	Mahanoy City,	Louis Lorenz,	3,000.00	6,000.00
		Mitchel & Symonds,	5,677.17	10,116.08
		Stephens & Bossler,	150.00	
Repplier,	New Castle,	J. F. Quinn,		3,106.18
Mammoth,	Broad Mountain,	Mahany & Co.,		750.00
Woods,		George S. Woods, agent,		1,054.12
Garfield,		Tim Cockhill,		252.04
Kiem & Repp,		Samuel B. Myers,		165.00
W. C. Diamond,		John W. Davis,		566.18
Dundas, No. 7,		Davis & Co.,		5,000.00
Total,			1,367,531.06	1,726,089.12
Sold or consumed at collieries,			93,549.11	103,566.14
Gross total produced,			1,461,670.17	1,829,656.06

SECOND DISTRICT.

OFFICE OF INSPECTOR OF MINES,
SHENANDOAH, SCHUYLKILL COUNTY, *March 18, 1882.*

To His Excellency HENRY M. HOYT,
Governor of Pennsylvania:

SIR: In compliance with section twenty-two of the ventilation act, approved March 3, 1870, I have the honor to submit the following report as Inspector of Mines for the Second or Shenandoah Division of the Mining District of Schuylkill, for the year 1881:

The accidents in and about the mines of the district, together with the statistics of the production, number of employés, &c., have been tabulated. The improvements made during the year at the different collieries are reported. The fatal accidents that have occurred are described in detail, and suggestions are made as to changes in the ventilation act, which, if adopted, will, in my judgment, reduce the number of accidents occurring.

The production of the district was seven hundred and fifty thousand eight hundred and thirty-nine tons greater than for the previous year, while the deaths from accidents are five less. The ratio of tons of coal produced in 1880, to lives lost, was ninety-six thousand two hundred and fifty tons; in 1881 it is one hundred and thirty-two thousand four hundred and eighty-eight tons. This is a considerable decrease in the proportion of lives lost, although the number of non-fatal accidents reported is greater than in 1880. This may be due to more care having been taken by the operators in making their reports. Nearly one half of the collieries in the district are operated by the Philadelphia and Reading Coal and Iron Company, nearly all the employés of which are members of the Company's Beneficial Fund. The company reports to the mine inspectors all the cases that come upon the fund for benefits, and, although I have not enumerated all the accidents reported, as many of the injuries were of a very trivial character, there is little doubt that some accidents are returned in the report hardly of sufficient importance to merit notice.

The management and general condition of the collieries as to the health and safety of those employed have been steadily improving ever since the passage of the ventilation act. Many and important reforms, and a great improvement in the conditions surrounding all employed, have been effected by it; but the benefits secured would have been greater, if the act was not so general in its provisions. It is necessary that the responsibility

for accidents be placed where it properly belongs, and that a special set of rules for the discipline of each colliery be provided for. These defects in the present act detract from its efficiency, and will be more felt as the risks attending mining increase as greater depths are reached. A thorough revision of the mine law, with the object of more fully accomplishing the end aimed at in its enactment, will improve the condition of the anthracite mining population, and tend to modify the extreme opinions, and remove the bitter feelings, which have in the past caused so much trouble. The interest of capital will be thereby furthered, and the peace and prosperity of the Commonwealth advanced.

Very respectfully,

ROBERT MAUCHLINE,
Inspector of Mines.

Of thirty-four fatal accidents which occurred in this district in 1881, fifteen, or forty-four per cent., were due to falls of coal or rock; ten, or twenty-nine per cent., resulted from mine cars; three, or eight per cent., from blasting; three, or eight per cent., from carbureted hydrogen gas; and three, or eight per cent., from the machinery.

The Fatal Accidents from Falls.

No. 1.—January 4. Michael Hinnegan, a miner, aged twenty-seven, single; at the Kohinoor colliery of Messrs. R. Heckscher & Co. The seam is very thick, is almost level, and the mine cars are taken into the face. In working the breasts up, the bottom portion of the seam only is taken out, leaving the other benches as a top. When the boundary is reached, the next step is to blast out the pillar between two breasts, thereby making an opening as large as the area occupied by two breasts and a pillar. In this large space, the top benches are readily brought down in large falls by a few shots in the roof on each side of the breast. The breast in which the accident occurred had been driven to the boundary. Hinnegan and his partner had blasted a hole through the first section of the pillar, and were working on the side of the opening. The partner was drilling a hole, and Hinnegan stood behind him. They were conversing about the amount of powder that would be required, when a small piece of what is known as the charcoal bench fell, and, bouncing off the bottom, struck Hinnegan. He was thrown down amongst some loose coal, his ankle broken, and he was injured so badly internally that he died within two hours. Both the men had noticed the piece of coal which afterwards fell, as a slip ran along one side of it, meeting a similar slip at an angle, and forming a triangular block, but, after sounding it, they were satisfied it was safe. The cause of this accident was an error in judgment of the person killed.

No. 2.—January 12. James Curran, a miner, aged twenty-two, single; at the Glendon colliery of J. C. Haydon & Co.

Where the accident occurred the seam is about six feet in thickness and dips at an angle of forty degrees. Over the top bench there is a bed of slate which is apt to fall in large flat blocks from three to eighteen inches in thickness. This is both a source of danger and, through mixing with the coal, of trouble to the miners, who, to secure the top, stand rows of props. They worked on batteries made of plank laid across the props. The object of this was twofold. The batteries obviated the necessity of keeping the breast full, and the miners, who were paid by the car, received their money from month to month as it was earned. Then it was intended to use the batteries for the stowage of gob. This could not be done, however, as the coal flying from the shots soon filled the batteries, leaving no space for the gob, which mixed with the coal the same as in breasts worked full of coal. A serious objection to this plan of working is that large pieces thrown off by the shots, and flying down an incline of forty degrees, are apt to displace the props, thereby causing large falls and wrecking all the timber in the breast.

James Curran and his partner had finished their shift, having fired two shots. They sat on the gangway watching the loaders for a half hour and then, before going home, concluded to ascertain what execution the shots had done, as, from the sound, they feared some props had been displaced. They went up the outside breast as far as the first heading and through the heading. Standing at the mouth of the heading they could see the face of the breast, not more than twenty feet distant, and that the props near the face had been displaced. For the purpose of making a closer examination Curran walked a few feet into the breast, holding his light above his head to enable him to see the top. While he was thus engaged, a broad flat piece of slate fell near the face and slid down on top of him. Curran was instantly killed and his partner injured, his foot being jammed against the lower side of the heading.

This accident was due to an imperfect system of working, and the failure to exercise a proper degree of caution by the miners. Having fired the shots, they should have gone home and given the breast time to fall and settle, when they could have made the examination with safety.

After this accident, I requested the superintendent of the colliery, in order to secure greater safety, to alter the system of working, and to work the breasts full to the face.

No. 3.—February 18. Thomas Moren, a miner, aged thirty-five, wife and four children; at the West Shenandoah colliery of the Philadelphia and Reading Coal and Iron Company.

This accident occurred in the east gangway of the seven-foot seam. The seam is six and one half feet in thickness, and dips at an angle of twenty-seven degrees. The breast in which the accident occurred was worked twenty-four feet in width, and the top and face was in fair conditon. Thomas

Moren and his partner fired a shot in the bottom bench, which only blowing the bottom, left a piece of the top bench hang. They sounded this and determined it was safe. Moren had just started to dress off some small pieces about the shot, when the piece of hanging top bench fell on him. One of his feet was mashed, and he was so severely injured internally, that he died within three quarters of an hour after the accident, and before he could be taken to his home.

The cause of this accident was an error of judgment on the part of the person killed.

No. 4.—March 15. William Couch, a miner, aged twenty, single; at the William Penn colliery of the William Penn Coal Company.

This accident occurred in the east gangway of the Holmes seam. This seam is in two benches, and dips at an angle of forty degrees. The slate over the top bench is weak and friable, making a dangerous and unprofitable top. To overcome this, in working the breasts up, the bottom bench only is mined, and, because the top may break and the slate be thereby mixed with the coal if drawn from the battery, the breasts are worked full, surplus coal being put down the manways. When the breast is driven up, the coal is loaded from the battery as rapidly as possible, the object being to secure all that can be gotten before the top slate falls.

In William Couch's breast, a piece of the bottom bench was hanging at the top of his manway. He was crossing below it to get over to the safe side for the purpose of putting in a hole to blow it down, when it fell and crushed him against the lower side of the heading.

The timbering in the manways and the top in the breast were in good condition, and it would compare favorably with the majority of working places in the district. Couch was engaged in removing the source of danger when killed. Had he gone down to the battery, crossed to the other side and gone up, he might not have been killed; but that would have been exercising a degree of caution not practiced by the most careful miners.

No. 5.—March 21. Evan Davis, a miner, aged sixty, wife and seven grown children, nearly all of whom are married; at the Primrose colliery of the Primrose Coal Company.

The plan of working where this accident occurred, was to run the coal on sheet-iron, the dip being about twenty-five degrees. The pillars were thin, and in skipping, a piece was taken off the side, starting at the head of the chute and continuing until the top fell. The amount of coal obtained depended on the distance the pillar would stand skipping before it weakened and brought on a crush, filling in the whole breast and closing in the upper portion of the pillar with rock.

Evan Davis' working place was very dangerous. There was no way to secure the top, and it was impossible to hear any indication of danger, owing to the noise made by water falling. He was sitting in the mouth of the heading conversing with a miner from another breast, while his partner, who was his son, was drilling a hole in the face of the skip, a few feet

above him. A piece off the top of the pillar fell on him, inflicting injuries from which he died the following day.

This accident could not have been prevented, except by not working the place at all, as it was impossible to make it secure.

No. 6.—April 8. Patrick Lacey, a miner, past middle age; at the West Shenandoah colliery of the Philadelphia and Reading Coal and Iron Company. Patrick Lacey was injured by a piece of coal falling on his back, while he was working in his breast. His injuries were at first not considered serious, but he died on the 20th of the month, or twelve days after the accident.

No. 7.—July 16. Philip Smith, a miner, aged forty-five years, wife and large family; at the Plank Ridge colliery of the Philadelphia and Reading Coal and Iron Company. This accident occurred in the east gangway of the Skidmore seam. The seam is about six feet in thickness, and nearly level. A buggy is used to carry the coal from the face to a platform on the side of the gangway, from which it is loaded into the wagons. The top is very weak, and careful propping is required to secure it. Philip Smith's breast was about twenty-four feet in width. A narrow-gauge track for the buggy was laid up the center, on both sides of which a row of props stood to protect it. Smith and his partner fired a shot in the left corner of the breast. It was pay day, and both the men were anxious to get out. Before leaving, Smith determined to see what work the shot had done, notwithstanding the protest of his partner, as it was well known to both of them that the top over the shot was unsafe. Without waiting for the smoke to clear, he ran close into the face and was covered with a fall of top slate. It was probably his intention to examine the shot from the buggy track, where the top was secured by the props, but not being able to see, owing to the smoke, he ventured close in and was killed. The accident was due to the failure to exercise proper caution.

No. 8.—July 29. Joseph Vollance, a miner, aged fifty, wife; at the North Mahanoy colliery of the Philadelphia and Reading Coal and Iron Company. This accident occurred in the Skidmore seam. The coal is six feet in thickness, and dips at an angle of 20°. It is carried on sheet-iron to the gangway. Immediately above the coal that is worked is a bench of bony coal and slate, a foot in thickness. Above this the top is good. The one foot bench was propped, as otherwise it would have fallen, and required labor to remove it from the marketable coal. Joseph Vollance was raking loose coal on to the sheet iron. He was at work some fifteen feet from the face and among the props, when a piece of coal that was not supported fell out from between slips and killed him. The breast, upon examination, proved to be in more than average condition as to safety.

No. 9.—August 16. Joseph Davidson, a fire boss, aged twenty-five, wife and one child; at the Ellengowan colliery of the Philadelphia and Reading Coal and Iron Company. At seven, A. M., Davidson was not at the bottom of the shaft to report as to the condition of the workings, as is the

PLAN OF WORKINGS,

ELLANGOWAN COLLIERY,

Where Joseph Davidson, Fire Boss, was killed August 16th, 1881.

REFERENCE.

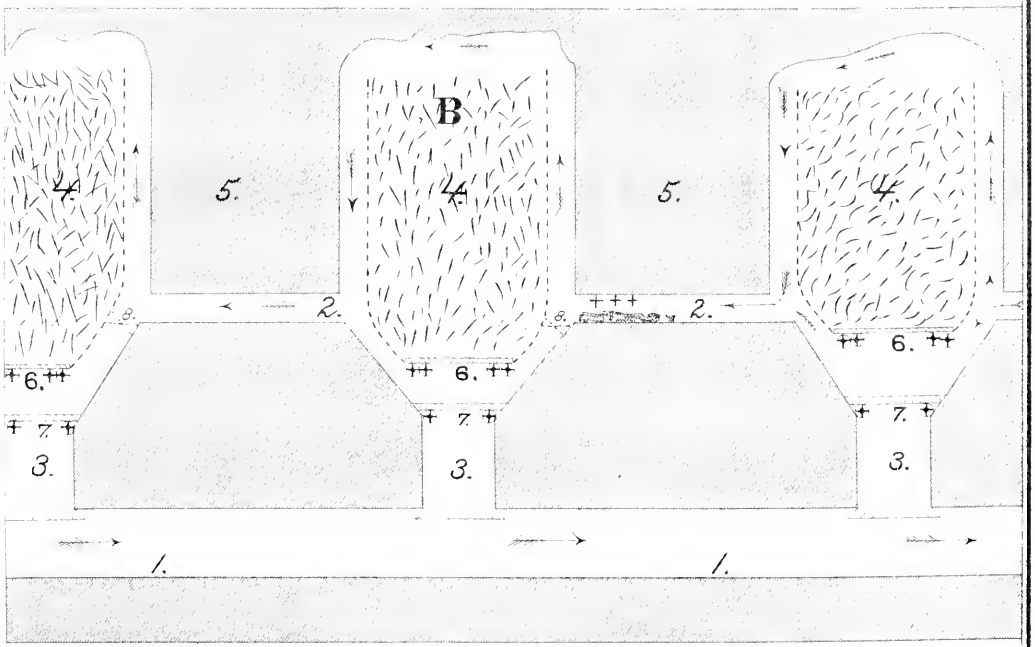
No. 1. Gangway running East.
" 2. Pillar Headings.
" 3. Chutes.
" 4. Breasts Containing Loose Coal.
" 5. Solid Coal, being pillars between Breasts.
" 6. Battery with Draw-Hole in centre.
" 7. Air Battery with Man-Door.
" 8. Canvas hung across Manway to force current in Breast.

Dotted lines represent Manway Timbers.

B.—Breast where top fell.

+ + + Place where Davidson was found.

Direction of Air Current.



practice. A search was instituted, when he was found dead in the heading of breast No. 27, east top split gangway. His head was crushed, one of his ankles broken, and his face was slightly burned.

As there is a difference of opinion whether the accident was caused by a fall of top coal or an explosion of gas, the accompanying diagram is furnished to assist the explanation. Davidson was found in the heading at the point marked ***. He was lying face downwards with his head to the east or right. His cap and common lamp were found near him. His safety lamp has not been found, but may be when the coal is removed from the breast. The Mammoth seam, in which the accident occurred, is very thick here, and is divided into bottom and top sections by a dividing slate. The breasts are worked up on the bottom, and, as the dip is about thirty degrees, they are almost empty. The top is blasted down afterwards. The breast in question was up not more than forty feet above the heading. The miners working it had quit early on the evening of the 14th, as there were indications of a heavy fall of top; the 15th was a holiday and they were not out. When Davidson was found the top had fallen, crushing the manways down to the heading and filling the breast, thus preventing an examination above the heading until after some of the coal had been removed.

As the body was burned, I endeavored to find signs of an explosion, but there were no traces of fire on any of the timber, and the canvas, fixed to carry the current up the breast, was not burned or even torn from the nails holding it.

The reasons for believing that the accident was not caused primarily by an explosion are: *First.* If Davidson had accidentally ignited a few feet of gas at the face of the breast, either with an open light or by a fall, forcing it through the gauze of the safety lamp, he would have been thrown down the breast and have been covered with the fall of top coal. *Second.* Suppose the fall occurred before he entered the breast, and by crushing the manway timbers, blocked the current and caused an accumulation of gas which gathered down to a point where he would come in contact with it as he came through the heading from the breast inside. If he had fired such a body of gas by holding his open light up among the broken timber or in any other way, there would have been a very heavy explosion which must have destroyed the air battery and caused considerable damage.

It is probable that, as Davidson was going up the manway, he discovered that the top was about to fall; that he turned and made an effort to get back into the heading; that just as he reached the mouth of the heading and was stooping to enter, the fall occurred; that the concussion, confined by the battery, expended its force through the heading, driving Davidson into it and dashing him against the side; and that the traces of burning on the body were caused by a small quantity of gas forced into the heading by the fall, and fired by coming in contact with his lamp.

No. 10.—October 11. Peter Ward, a miner, aged sixty years, a widower with grown up family; at the Indian Ridge Colliery of the Philadelphia and Reading Coal and Iron Company.

In the breast worked by Peter Ward and his son the seam dipped twenty-four degrees, and the coal ran to the gangway on sheet iron. They had worked the breast to the boundary, some eighty yards, and were thinning the pillar by skipping. A large piece of the three-feet bench projected from the pillar, which, while Ward was sounding it with a pick, preparatory to blowing it down, fell and crushed his leg. He died the same evening.

No. 11.—October 14. Mark Willis, a miner, aged twenty-six years, wife and four children; at Honeybrook, No. 4 slope, E. B. Leisenring, lessee.

The seam where this accident occurred dips at an angle of thirty degrees and the breasts are worked up in the bottom bench; the upper benches are afterwards blown down. The coal is very hard and is broken off by the shots in large pieces which often block in the breast when coal is drawn at the chute, and afterwards rush down, often damaging the manways. While Mark Willis was working at the face of his breast a piece of the top bench fell, and caused the coal to rush. The bottom was taken from under him and he was carried down the middle of the breast. Some large pieces rolled on top of him, broke his leg and injured him internally so that he died on the fourth day after the accident.

No. 12.—October 21. John Ward, a miner, and Miles Keller, a laborer, both married and having families; at the Mahanoy City colliery of the Philadelphia and Reading Coal and Iron Company.

The Mahanoy City colliery consists of a hoisting slope on the Mammoth seam to a lift below the water-level gangway with a tunnel driven south to the Primrose seam. When the gangway on the slope level was completed, an inside slope was sunk at a point on the gangway far enough east to reach the deepest part of the basin. The inside hoisting and pumping machinery are run by air compressors placed on the surface near the mouth of the slope. At the time of the accident, pipes conveying the air were laid along the water-level gangway to a point over the inside slope, down through a worked-out breast to the hoisting engines, also down the slope to the pump. For several weeks previous to the accident frequent falls had occurred in the worked-out breasts in the neighborhood of the inside hoisting engines, and also along the water-level gangway, which had broken the air pipes at least twice in the previous three weeks. On one of these occasions the engineer held the cage in the slope with the brake, and thereby prevented great damage being done to the machinery. Men were employed repairing the timber on the water-level to protect the air pipes. The falls were caused by a creep or squeeze supposed to have been brought on through the robbing of the pillars in the North Mahanoy colliery, which is working the underlying seams. At the outside of the inside slope turnout on the gangway leading to the bottom of the main hoisting slope, two alternate sets of timber had been knocked out several years previous and not replaced. The timber of the gangway was otherwise intact, this place being the only unprotected point.

On the morning of the accident, as the two men who were killed, with

Thomas Ward, a brother of one of the victims, and Timothy Whittle, were passing this place while going to work, a piece of coal fell out of the top, which, breaking in pieces on the collar of the set of timbers still standing, fell on the four men who were walking in pairs. Besides the two men killed, Thomas Ward and Whittle were injured by the fall.

This accident occurred on the principal gangway of the colliery, which should be maintained in safe condition if any part of the workings are. The unfortunate men had no reason to anticipate danger at such a place, and, therefore, were in no way responsible. Objection is justly made to the mine ventilation act, that it is too indefinite in its provisions in defining the duties of miners and mine officers, and that too much is required of the mining boss, in making him responsible for the condition of all the workings of a large colliery, as it is impossible for him to see that all loose coal, slate, or rock over-head is carefully secured against falling; but the mining boss can give the attention necessary to properly maintain the timbering of the gangways, and for their safety should be held to a strict accountability.

The two sets of timber, the failure to replace which was the cause of the accident, had been knocked out long before Mr. George Kilgore, the mining boss at the time of the accident, had been placed in charge of the colliery, although he had been in charge over five months. It was thought by some persons, that because the timbers were removed before he assumed charge, that Mr. Kilgore was not responsible under the law, and, to settle this question, and because, in my judgment, the case involved such a flagrant violation of the law, that the party responsible merited punishment, I brought suit against the mining boss. After repeated postponements, at the request of the counsel of the defendant, the case was tried at the March term, 1882, and a verdict of guilty, with a recommendation to the mercy of the court, was rendered.

No. 13.—October 24. William B. Thomas, a miner, aged thirty-five years, wife and one child; at the William Penn colliery of the William Penn Coal Company.

William B. Thomas worked in a breast in the Holmes seam, and when the accident occurred was tamping a hole to blow down a piece of coal to make room for a juggler. The vibration caused by the tamping loosened the piece from a slip, which it was impossible to see, and it fell. He was instantly killed. The breast, upon examination, appeared to have been worked with due regard to the safety of the miners, and the accident could hardly have been guarded against.

No. 14.—November 25. Martin Dwyer, a miner, aged forty, wife and three children; at the Glendon colliery of J. C. Haydon & Co.

The breast in which the accident occurred is in the Buck Mountain seam. The coal is twelve feet in thickness, and in working the top half of the seam is first taken out. The bottom is afterwards blown up, a bench of ten to fifteen yards of the bottom coal being always kept at the face. Martin

Dwyer and his partner were standing on this bench barring with drills at each side of a piece of coal in the face, when suddenly it loosened and fell. The coal was carried from under Dwyer's feet and he rolled over the bench and off of it with the coal. The larger piece rolled on him and inflicted injuries from which he died before he could be carried to the bottom of the slope.

These accidents from falls of roof and sides—fourteen in number—are nearly forty-five per cent. of all the fatal accidents that occurred in the district. In the non-fatal accidents those from falls constitute a still larger proportion. It is of the highest importance, therefore, that proper attention is paid to the consideration of the question of preventing accidents from this prolific source. Since the enactment of the ventilation act in 1870 great improvements have been wrought in the condition of the collieries of the anthracite region, as regards both the volumes of air obtained and their distribution. There is still ample room for improvement, but there is little doubt that the progress made in the past will be continued in the future, that the sanitary condition of the mines will continue to improve, and the ratio of accidents from accumulations of poisonous gases by explosion or suffocation continue to grow less. With more attention to discipline and improved construction the number of accidents from machinery, mine cars, &c., can also be reduced; but to reduce the number of accidents from falls is much more difficult. I am of the opinion, however, from information gathered by examination of the places where the accidents occurred, from the testimony given at the inquests, and by carefully questioning the partners of the victims, that four fifths of this class of accidents are preventable. The gangways and main avenues can be made secure beyond peradventure by faithful inspection at stated intervals and by careful timbering; but in the working places, where the explosion of a single shot may make a practicably safe breast very dangerous, it will be more difficult to correct the evil.

An analysis of the accidents reported, shows that of fifteen deaths, two occurred in the main gangway, and could have been prevented by the exercise of ordinary care and prudence by the officers in charge of the colliery; that only two happened in breasts on an angle of more than thirty degrees, worked by keeping the breast full and on contract by measurement, while ten occurred in breasts on so low an angle that either sheet-iron or buggies are required to get out the coal. Of these ten, but two lives were lost in places where the top was too high to be secured with propping.

The systems of mining and management at many places, are in some degree responsible for the large mortality from falls, and could be altered with advantage.

Where the seam is very thick, the breasts are worked up wide, and so much coal is blown down that it is impossible to examine the top, thereby increasing the risk of the miner, who works under a roof of which he knows

and can learn nothing. The object in working with large openings is to cheapen the cost of mining in powder and labor expended, and to save in narrow work for ventilation; but this is only accomplished at the cost of many lives.

Most of these accidents occur in comparatively flat seams where the coal, as a rule, is much harder than where the seams are on heavy angles. More powder and labor is required in mining, and a great deal of labor is often expended to get the coal down to the gangway. Sometimes a colliery's supplies run out. Where sheet-iron was not to be had until the first of the coming month, I have known men to shovel their coal a great distance until it reached the point up to which the sheet-iron was put down, and in breasts in which the wagons are taken to the face I have known times when the difficulty experienced in getting rails, ties, spikes, and tools to lay track was as great a hinderance as was the want of sheet-iron in the other class of work. The want of these necessary supplies adds largely to the miner's labor, and diverts his attention from the top and face of his working place, where so much of it is required to secure his safety. The inconveniences and dangers of this class of working places tend in another way to increase the ratio of deaths in them, as the best class of miners, those qualified to protect themselves, will not work in them if they can avoid it. The competent, careful miner will seldom be found, except temporarily, pushing coal on sheet-iron or loading a wagon in a high, wide breast where he cannot examine the top. He prefers a place where the angle is great and there is a little gas, as there is likely to be more watching and drilling and less shoveling and pushing, for well he understands that with the exercise of judgment and proper caution he can protect himself from gas and keep up his manway far easier than look out for falls of top when his time is occupied in hunting for rails, ties, and spikes, or sheet-iron, or in pushing and shoveling until bathed in perspiration in order to load his wagon in time for the next trip.

The system of long breasts carried up eighty or one hundred yards, in which the coal is run down on sheet-iron, is another source of accidents of this character. Such working places last too long. When up sixty to eighty yards, the top, near the chute and in the lower portion of the breast, becomes weakened and is no longer safe. For months it has been subjected to the strain caused by removing the coal as the breast advanced; to reverberations from shots, and to crushing, as indicated by the props sinking into their cap pieces. One of the miners is almost constantly employed in putting coal down the sheet-iron, and is exposed to injury from a fall while so engaged. Where there is much propping to be done, it is usually included in the miner's contract, and, unfortunately, in this class of work for reasons previously stated, the miners are usually neither competent nor cautious. Oftentimes they are unable to set timber to advantage, and, because so much labor is involved in carrying the timber up, they do as little of it as possible, and, in many instances, would do less if they were not

forced to protect themselves by the mining boss and his assistants. As a rule, the longer the breast the less the number and the smaller the size of the props.

The system of short leases is an important agency in increasing the number of these accidents. When the capitalist invests on a fifteen year lease his improvements will necessarily be of a temporary character, and he will adopt that system of mining most likely to give the greatest return on his investment during the continuance of the lease. To avoid the expense of moving pumping and other machinery, of locating bottoms, of narrow work, &c., he works with long lifts, which are opened in wide breasts, to reduce the cost of mining. This is to the operator's advantage, although the land owner suffers largely in coal lost, and the accidents from falls are increased. Seams at angle of less than thirty degrees could be worked in short lifts to the best advantage of all concerned, including the operator, providing the tenure of the lease was longer. The breasts should be driven narrowly to be safe, and opened through to the gangway above. They could then be robbed back in sections or panels with less risk of accident from falls, while the ventilation would be better than with any other system, and the percentage of coal per acre obtained much greater.

The present mine law is defective in many particulars, and must be thoroughly revised before the mine inspectors can expect to make much progress in reducing the number of accidents from *falls*. The law makes the mining boss responsible for the security from falls of all the working places in a colliery. He is to see "that all loose coal, slate, or rock overhead is carefully secured against falling." This is impossible at many of the collieries of this district. The mining boss of a colliery with extended workings, even with the aid of a fire boss, who is supposed to be his assistant, cannot give that degree of attention to the security of all the employés that this clause of the act contemplates. And for the same reason, viz: that entirely too much is expected from one person, the regular morning investigation of the fire boss, provided for by law, cannot be an inquiry as to the safety from falls of the working places, because each fire boss has so many places to visit, that the examination is nothing more than a hurried search for gas, and, as the fire boss' visit is made when the miners are not in their breasts, there is neither opportunity for pointing out threatened dangers or for consultation as to their removal.

The law should provide that the mining boss has a sufficient number of assistants, graded as to the degree of authority they exercise, and as to their responsibility. Each colliery should be divided into sections, and two assistants should be placed in charge of each section.

They should set or superintend the setting of all props or timber, lay track, repair brattice, and have authority to suspend mining when in their judgment danger was imminent. In order of seniority of appointment, they should be responsible for the safety of the section, after the fire boss has made his regular morning examination. If each group of breasts was

placed in charge of two such deputies, acting as timber men, repairs men and assistant bosses, responsible to the mining boss for everything except the ventilation and transporation, thereby permitting the miner to devote his entire attention to his work and the security of the top for a reasonable distance back, the number of accidents from falls would certainly be less. Of course these suggestions will not apply to work when the angle of the seam is so great that the breasts are worked "on the run" or full. The law should also provide as the present mine law of Great Britain does, that a special set of rules, which, after adoption, would form part of the statute law of the state, be established for each colliery. In these special rules the duties and degree of responsibility of all employés could be fixed, and provision could be made for the varying conditions that present themselves in mining owing to the differences in thickness and angle of inclination of the seams. A division of labor and responsibility suited to the conditions present in each colliery, in which the miner would be allowed full opportunity to protect himself, would thus be provided, which would likely be attended by the same beneficial results that have followed its adoption in other industries.

It will be objected to these suggestions that if the propping is to be done by men working by the day, the cost of mining will be increased. This may be true, but it is also true that greater security is not likely to be secured except at a greater present expenditure, which will, however, in great measure be repaid. The timbering, if paid for by the day, will be better done, and there will be a large saving in timber which is now wasted. Fifty per cent. of the miners working in flat breasts in the Shenandoah district, if sent to the timber pile to select pieces for general repair work, will ruin, through lack of experience in planning and measuring, more in value in timber than their day's labor is worth. With experienced timber men to get out all the timber, a great saving will be made over the present wasteful method.

If the law simply aimed at preventing accidents, without regard to the expense involved, it would prohibit contracting in places wider than eighteen feet or higher than eight feet. This would permit narrow work to be done by contract, and compel taking down coal and robbing to be paid for by day's wages, thereby reducing the temptation to miners to take risks in dangerous work for the purpose of increasing their earnings. The increased expense due to making the proportion of work by the day greater, would be partly compensated by the men best qualified for each particular kind of work naturally drifting to the jobs best suited to them.

The risks taken by miners to avoid labor and save time, are a fruitful source of death and injury. Miners will not stand props close to the face even if it is what they call a "little drawn," for fear the shots may knock them out again. If the timber is set by the employer they will send for the timber man whenever a prop is required. A difficulty that may have to be provided against is, that if the operator is responsible for the top

within a few feet of the face, the miner may sometimes have to wait for the timber men.

In inquests on victims of fatal accidents from falls, if the ventilation is fair, so that the smoke is freely carried away, and objects in the working place can be distinctly seen, if the usual morning examination has been made, and if timber is supplied in sufficient quantity to properly secure the place, the common verdict is "accidental" death, the result of "carelessness" or "ignorance." A life has been lost, and, perhaps, a wife widowed and children orphaned, because a "careless" or "ignorant" man has been employed in a position for which he was wanting in the necessary knowledge and skill. That this should be the case is the fault of some one, and proves conclusively that some *careless* or *ignorant* or *worse* person is occupying a position of responsibility. This is, unfortunately, too often the case, and it is an evil that must be remedied before the root of the trouble can be removed. The attention of the public has been frequently called, in the past, to the great necessity of requiring some test of qualification from mine officers and other employés, but the recommendation has either passed unnoticed or been sneered down by those who pretend to despise technical training and knowledge. The royal road to the prevention of accidents, however, is by changing officers and men from mere actors to thinking, responsible agents. This is the result of experience in Belgium, France, Germany, and England, and there is no doubt that this is the direction in which effort for improvement promises the best results, and in which it should first be made. The law should provide that all employed—from the superintendent to the door-tender—should pass an examination as to their qualification for the position they occupy, and it should provide penalties for the punishment of those who employ persons upon whom depend, to any degree, the safety of others, who have not passed such an examination.

Fatal Accidents from Mine Cars.

No. 1.—April 25. Thomas Delaney, an outside laborer, aged nineteen years; at the Cuyler colliery of S. M. Heaton & Co. Thomas Delaney was engaged at the bottom of the plane on which the coal is hoisted to the breaker, and was killed while attempting to uncouple a car with his hand, instead of using the bar provided for that purpose.

No. 2.—May 6. Robert Edwards, an oiler boy, aged fifteen years; at the Connor colliery of the Philadelphia and Reading Coal and Iron Company. He was killed while riding on an empty car, through his head striking against a bridge that crossed over the track.

No. 3.—July 15. Philip Crosser, laborer, aged thirty years, unmarried; at Honeybrook, No. 4, E. B. Leisenring, lessee. Philip Crosser was employed at the bottom of the slope, where the tracks are so arranged as to permit the empty cars descending to run off the slope on to one track, while the loaded cars to be hoisted stand on another; both tracks being graded in opposite directions, so that both empty and loaded cars move by gravity. A pair of spring tongues are placed a few feet above the bottom, which

serve to keep the empty track open for the descending cars. Crosser removed the springs for the purpose of lowering a car of timber on to the loaded track, and forgot to replace them. The next empty car ran on to the wrong track, and caught him, as he was standing on it in front of the loaded cars, with his attention occupied in speaking to some one near. At the time, his injuries were not considered serious, but he died on the 20th of the month.

No. 4.—September 7. John Rupert, a driver, aged eighteen years; at the Cuyler colliery of S. M. Heaton & Co. John Rupert was driving a team, and was hauling two cars along the gangway. In attempting to step on the bumpers of the first car, while the trip was in motion, his foot slipped, and he fell under the wheels and was killed.

No. 5.—September 28. Patrick Rowley, a miner, aged twenty-five years, unmarried; at Packer, No. 3, colliery, of the Mahanoy division of the Lehigh Valley Coal Company.

Patrick Rowley was riding up the slope, sitting in the back end of a car, and holding the bit end of a drill in his hand, level with his breast. The butt end rested on the cross-bar over the middle of the car. When near the top of the slope he allowed the butt end of the drill to slip out over the side. It struck against a leg, and drove the bit end through his body. He was instantly killed.

No. 6.—October 11. Michael Martin, a loader, aged sixty years, with a wife in Europe; at Packer, No. 3, colliery, of the Mahanoy division of the Lehigh Valley Coal Company.

Michael Martin was attempting to jump on a trip of empty cars that was in motion, with the intention of uncoupling the car he was to load, as it passed his platform, without stopping the trip. He was standing outside a door, and, as he jumped, was caught between the cars and the door frame, receiving injuries from which he died on the 18th of the month.

No. 7.—November 3. Thomas Yarnell, a driver, aged fifteen years, at the Ellangowan colliery of the Philadelphia and Reading Coal and Iron Company.

Thomas Yarnall was driving a mule, hitched to a dumper on the culm bank. He was attempting to unhitch the mule from the dumper when his foot slipped on the rail, and he fell under the wheels. As the dumper was being run very rapidly, to gain momentum to cross a bridge, he was instantly killed.

No. 8.—November 29. Richard Cox Northey, a miner, aged thirty-five years, wife and three children; at the Coal Run colliery of the Suffolk Coal Company.

At this colliery a branch of the Philadelphia and Reading railroad, connecting Ellangowan and Knickerbocker collieries with the main line, crosses the mine car track leading from the slope to the breaker. Northey was on his way from the blacksmith shop, where he had been for his tools, to the slope for the purpose of descending to go to work, and, with some others,

was standing on the mine car track, waiting for a train of railroad cars to pass, so as to get across to the slope. While standing and watching the passing train, an empty mine car was being run down the track from the rock bank to the slope, which is down grade to the crossing. The man in charge of this car permitted it to run away, and being unable to follow it, cried out, but the noise of the passing train prevented Northey from hearing him. With his back turned towards the runaway car, he did not see it until it run him down, driving him against the railroad cars, and inflicting injuries from which he died on reaching his home in Mahanoy City, two miles distant.

No. 9.—December 13. David Perry, a driver, aged seventeen years, at the Kohinoor colliery of R. Heckscher & Co.

David Perry was fatally injured by being caught between two mine cars. He was standing on the front end of a half loaded car which he was bringing out on to the empty track where some empty cars were standing. Forgetting they were there, he failed to get off his car in time to escape being crushed. His injuries were in the head, and he never regained consciousness. He died on the 17th of the month.

No. 10.—December 30. Patrick Cosgrove, coupler, aged seventeen years, at the William Penn colliery of the William Penn Coal Company.

Patrick Cosgrove was engaged at coupling cars near the top of the breaker, and was called up the road toward the shaft to help put on an empty car which had ran off the track. In returning to his place he attempted to jump on a trip of cars that was being run from the hoisting shaft to the breaker, when he slipped and fell. Two of the cars ran over his leg, inflicting injuries from the effects of which he died the same evening.

Of the whole number of fatal accidents in this district—thirty-four—ten occurred from causes connected with the use of mine cars. Five happened inside and five outside, and of the whole number but one was really an unavoidable accident, that would be fully covered by the verdict "accidental death," the stereotyped conclusion of the deliberations of coroners' juries in all such cases. Accidents from mine cars are usually due either to defects in the construction of the cars or dumper used, or to lax discipline, and, in most cases, are preventable. If amendments, covering the points detailed below, were made to the mine law, accidents of this character would seldom occur:

First. Many of the cars and dumpers used are faulty in construction, in that, owing to the shortness of the buffers, or the inclination outwards given to the ends of the frames or boxes, there is not sufficient room to couple them with safety. The law should provide that every car, dumper, or vehicle used on rails in conveying material in and about a colliery should be so constructed that it could be coupled with perfect safety with the exercise of ordinary prudence. If a space of two feet, in the clear, when the cars are standing against each other is necessary the law should provide for it.

Second. The mules should be hitched to the cars with a detaching hook or other contrivance, such as is used in railway construction, and which is operated from the side. The driver could then unhitch the team without reaching into the center of the track, by the action of a spring, strap, or other device, while walking along side the trip. If the law provided for the use of such a means of securing safety, the present rude, though effective, appliances would doubtless soon be improved.

Third. It may be cheaper to employ boys as drivers at $7 per week than men at $10 20; but if the advantages gained by employing the labor best adapted for each description of work are allowed for, there will be but little in the difference. Boys cannot properly care for themselves when employed about cars or machinery, and the law should provide that no person under eighteen years of age could be so employed, except as a door-tender or in similar tasks.

Fatal Accidents from Gas.

No. 1.—March 14. Patrick McLaughlin, a miner, aged forty-two years, wife and four children; at the St. Nicholas colliery, of the Philadelphia and Reading Coal and Iron Company.

This accident occurred in one of two breasts, which were being worked day and night, to make a connection, as soon as possible, with the lift above, so as to improve the ventilation, of which I had complained. The breast was up about sixty yards, on an angle of fifty degrees. The heading on the intake side was about eight yards below the face, and that on the return side, which was next to a finished breast, was some twenty yards from the face. There was a jump on the bottom slate, and it was the intention to put in another length of manway, so as to get above it, and then to drive another heading, to bring the air close to the face. This would enable the balance of the distance to be driven up narrow, and the desired air connection thereby made. The ventilation was very poor, and the distance of twenty yards, between the heading and the face, caused what little current was moving to pass from the intake heading diagonally across the breast—through the openings in the manway plank and loose coal—to the return heading, leaving a large space at the face unventilated. On the day of the accident, the day shift did not work, and the colliery was idle, the water accumulating too fast for the pumps. The fire-boss, on examining the place in the morning, found it clear of gas. In the evening, however, upon meeting the night shift at the head of the slope, on their way to work, he advised them to be careful and examine the breast with the safety lamp before taking naked lights into it, stating, as a reason, that he had not been there since morning. When the parties reached the breast, McLaughlin went up with the safety lamp, and found three or four yards of gas on the return side. He then rapped on the timber, to draw the attention of the men in the other breast, who came through the intake heading and examined that side of the breast. They reported to McLaughlin, who was opposite, that the gas was down to within six or seven feet of the

heading. McLaughlin then ordered his partner down to the heading with the lamp, as he determined to run through the gas, over the coal, along the face, and put up a piece of canvas on the other man-way, to keep up the air, and thus displace the gas. One of the other men held the light at the intake heading, so McLaughlin could see his way across; but as soon as he got into the gas he was overpowered. He fell back into the manway, getting his foot fast behind a manway prop, and his partner and the other men, although they attempted to do so, were unable to rescue him. The gas had first to be blown out from the intake side of the breast, which was done with a hand fan; but the time required to do this was so long that McLaughlin died before he was gotton out.

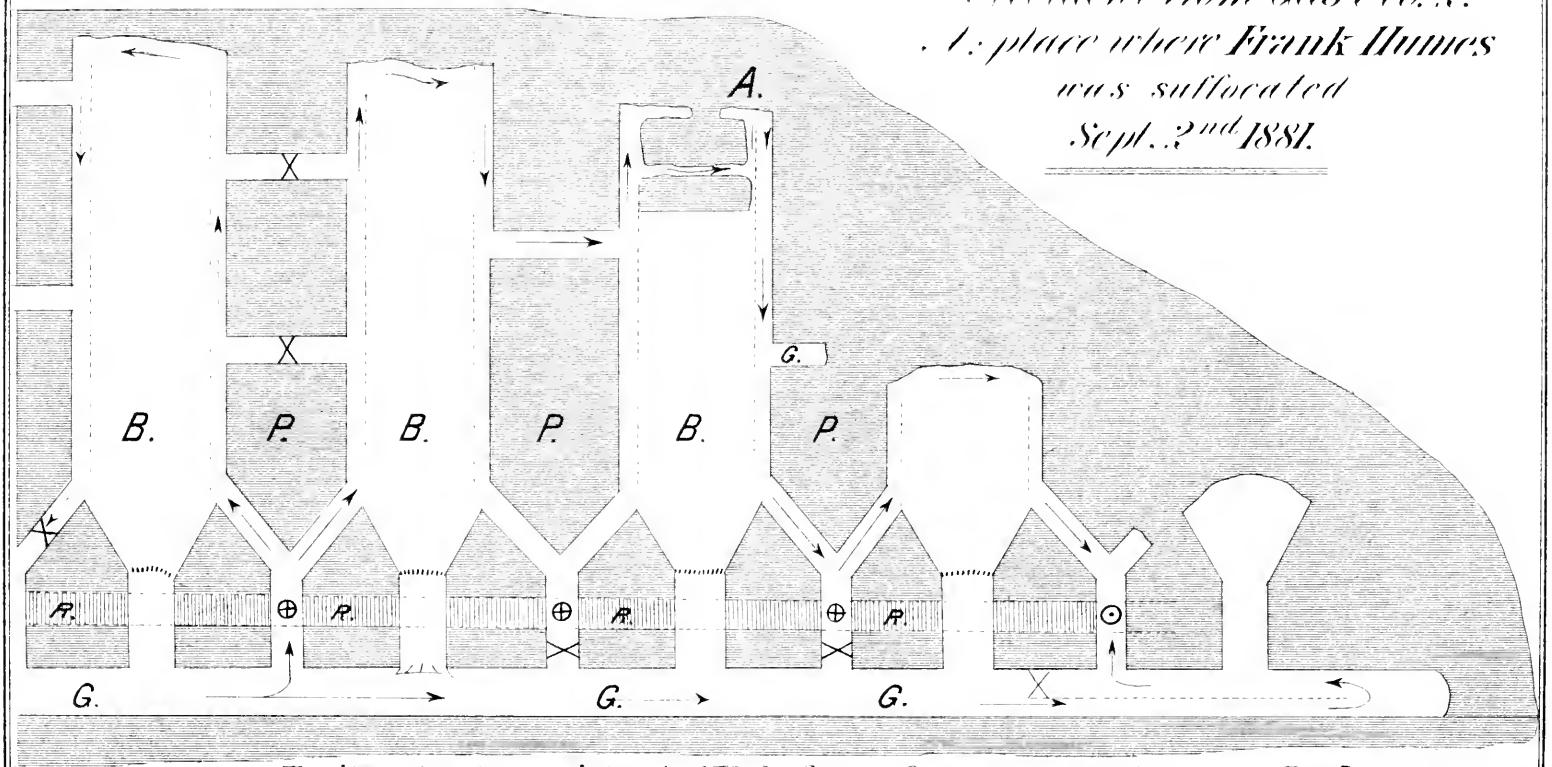
On inspecting the place the next day, the breast was clear of gas, but it seemed to me the manway had been repaired between the time of the accident and my visit, as there was a current of air at the face sufficient to prevent a quantity of gas accumulating. The cause of the accident was, probably, that the fan had been permitted to run very slowly during the day, to save steam for the pumps, which allowed the gas to accumulate. Had the fan been running rapidly it would have kept the breast clear of gas, but, if stopped for a time and the gas permitted to accumulate, the current afterwards produced was insufficient to overbalance the buoyant power of the gas and displace it. The conditions were such, that if the fan had been kept running, and the manways had been tight, the gas could not have accumulated, but the current was not strong enough to break up and remove a body of gas when once gathered.

If the man had not voluntarily gone in among the gas he would not have been suffocated. To take a safe route to the point he wanted to reach, he would have been compelled to go down a distance of sixty yards to the gangway, and up the same distance on the other side of the breast, which was on an angle of fifty degrees. Instead of doing this, he took the easiest route, and lost his life. Then, again, had the mining boss ordered the men to drive a new heading, when they found trouble with the gas, this accident would not have occurred. But to have done this would have involved an expense of from fourteen to sixteen dollars, which, by pushing the breast a little further, was saved. Capital, therefore, was also to blame.

All that prevented me from prosecuting the mining boss was that prudence had been exercised in selecting what were supposed to be skillful and experienced men. They had been warned by the fire boss and had found the gas. They also knew they were working at special work for the very purpose, at my suggestion, of improving the ventilation.

No. 2.—September 2. Frank Humes, a miner, aged thirty years, wife and child; at the Girard colliery of the Philadelphia and Reading Coal and Iron Company.

This accident occurred in a breast on the east south dip of the Mammoth seam which dips at an angle of 46°. The coal is very slippery and gives off large quantities of gas. The seam is thirty feet thick, and the bottom



To illustrate accident No 2 from Gas in report R.M. Inspector.

bench is much harder than the top benches. The breasts are worked ten yards wide, and, because of the slippery coal, are subject to running. When a breast runs, the top benches sometimes slip out five or six yards ahead of the bottom portion of the seam, leaving a large opening above the manways, which fills with gas. There is no way to get up to examine this space or remove the gas from it, and, when another run occurs, this body of gas is carried down on to the miners. It is necessary, therefore, to maintain as large a ventilating current as possible, the velocity of which, in the manways, is very high. The manways must be driven small, so as to stand. When the coal runs and the gas is forced down, it is apt to be ignited, while the miners are hurrying down the manways, through the flame being forced by the current through the gauze of their lamps. Only safety lamps are used—the ordinary Davy—which will pass the flame at a velocity of six feet per second. The miners have standing orders to at once report any indications of a run in their breasts to the fire boss, who is in attendance on the gangway. When a run is reported, the other miners working on the same split are at once called down, for fear the current may become blocked.

The breast in which Frank Humes and his partner, Charles Harris, worked, was up some forty yards, and is the third breast represented in the diagram. The outside breast was up further, while the inside one had just been opened. The inside rib of Humes' breast was, therefore, in the solid. Some twenty yards up the pitch, a blind heading, C, was driven a few feet into the rib, to serve as a covering for the men when firing shots, and which, when the inside breast reached that heighth, could be driven through to serve as a heading.

When Humes' breast was up thirty-five yards it threatened to run, and was allowed to choke at the face, with coal, a small opening being left to carry the current from the outside to the inside manway. The manways were then pushed up a short distance, and a small heading, as shown in the diagram, driven through some three yards above the face, the manways being still in advance of the heading. The manway brattices were carried up, as usual, and the current was thus forced to the face of the intake manway, around the end of the brattice, down into and through the small heading, and up and around the end of the small stump thus formed, and down the return manway. This system of working involves the driving of these small headings every few yards, as the manways are pushed ahead. The ventilation is thus kept ahead of the breast face proper. The coal is loosened by firing a few shots in the small stump. Humes and Harris were engaged in driving the second of these small headings in their breast, as shown in the diagram—Harris on the outside, and Humes on the inside. When they stopped work on the evening of the 1st instant, they each were in about twelve feet, and could have put it through with a few hours' more labor. The air current was a split from the next outside breast, and ran down the inside manway of the breast in which the accident occurred,

across the breast just opened on the inside, and into the cross-hole of that breast, where it met the inside split from the gangways and chutes, the same cross-hole carrying both splits into the return airway driven over the chutes, as shown in the diagram. When the fire boss, Mr. David Morris, made his usual morning examinations, he found the outside end of the heading, and the manway, for two lengths of planks, filled with gas; the inside end of the heading contained about two feet of gas. The man who examines the other gangway was not out that morning. Morris found, on reaching the lamp-house at the bottom of the slope, that he would be compelled to examine the other portions of the colliery also. He, therefore, left orders with Mr. Cyrus Haywood, assistant fire boss, for Humes and Harris to put a length of plank on the inside manway, to clear out the gas and to put the heading through from that side. This order Mr. Haywood delivered, as he gave them their lamps. Humes objected, saying that two men could not work on one side. At the door of the chute of the breast the men consulted, and concluded that each would go into his end of the heading and rap, that they might ascertain whether or not the hole was being driven true. The assistant fire boss, Haywood, accompanied Harris, as his side contained so much gas. They rapped and heard Humes as though scraping in the small heading below. Harris then went down and up the inside manway, and at the blind heading, C, called to Humes, who cried back that he should wait awhile. In a short time he called again, and, on receiving no answer, went up and found Humes overcome by gas. He could not get him out alone, and went down and gave the alarm. David Morris crept into the heading and found Humes at the point A, his feet being some four feet from the mouth of the hole. Isaac Brassington caught hold of Morris' feet and pulled him and the body out. Had the men obeyed the order of the fire boss, Mr. Morris, implicitly, and, on going in, had both started to extend the manway brattice, to force the air up, the accident would not have occurred.

No. 3.—October 20. John Craig, a miner, aged thirty years, three children; at the Shenandoah City colliery of the Philadelphia and Reading Coal and Iron Company.

This accident led to a suit against the fire boss, under section eight of the mine ventilation act, for failing to examine the place in the morning, he having delegated that duty to a miner, without having consulted the mining boss.

The fire boss plead guilty, and was let off with an admonition from the court and by paying the costs.

The scene of this accident was among the old workings of the colliery, where a counter chute had been driven up through a pillar for the purpose of mining out pillars in an upper gangway. Samuel Roberts was doing the work by contract and employed and paid three other men by the day. The coal being taken out, was the pillar between the top and the bottom slate gangways of the old lift above the present gangway. The plan

adopted, was, to drive up narrow places until the old workings above were reached, the track being laid as the work proceeded. When the old workings were reached the pillars were robbed back. Gas had been occasionally found in this section, and it had been examined by the fire boss in the mornings, but, as it was several hundred yards distance from where the other men were working, it involved considerable extra work on his part.

Samuel Roberts, the contractor, told the fire boss that if a good safety lamp was left at a certain point he would examine the place himself and save him (the fire boss) the trouble. On the morning of the explosion Roberts took the lamp, examined the place, and reported it all right. The others with their naked lights then went up, and the safety lamp having been sent back, all commenced work; but Roberts, desirous of viewing the quantity of coal that had fallen during the night, held up his open light near to a hole which the last shot had blown through to the old gangway. The light ignited the gas which had been standing in the gangway overhead, and a fearful explosion occurred, filling the place thirty feet back with flame and burning all four men, but Roberts and Craig most severely. Craig died nine days afterwards.

Roberts, it was believed, was a competent miner, and he was considered capable of searching for gas. On the morning in question, however, he failed to make a careful examination or this accident could not have occurred, as nothing was done to force down the gas. This accident may be truthfully charged, like thousands that have preceded it, to "carelessness."

That but three deaths occurred last year from the presence of gas in the mines, and only one by explosion, in this district, where so much coal is mined, evidences the great improvement in ventilation which has been made under the anthracite mine act. The chief reason why so much has been accomplished under the law in this respect is, that the responsibility for bad ventilation is clearly defined, and the inspectors have, therefore, been able to secure the execution of the reforms they deemed necessary. In this district all accidents from this cause are preventable by intelligent and liberal management. It is here simply a question of volumes of air and their distribution. There are, as yet, no outbursts of gas to serve as ready excuses for disasters due to other causes, although different conditions may exist when the lower lifts of the steep angled basins are mined.

But it is not alone by the ratio of the reduction of the number of accidents due to accumulations of gas that we should estimate the benefits that have followed the passage of the mine ventilation act. This is but a fraction of the good it has wrought. A few years ago the great majority of the miners were compelled to work from eight to ten hours of every twenty-four in an atmosphere vitiated with carbonic acid and other gases generated in the combustion of powder, and so heavily laden with smoke that objects only a few feet distant were invisible. Some men may still be found in each colliery working in a smoke-laden atmosphere, but all who are familiar with the subject will admit that the general condition has been

greatly improved. The young miner of the present, when he attains the age of forty or fifty years, will not be a physical wreck, broken in health and constitution, as are too many of those who commenced life in the mines twenty years ago. An intelligent miner said to me the other day, "give me plenty of air, and I am willing to work hard, only give me air." Plenty of air can be furnished, and whether, in this district, it is supplied in ample volume or not depends entirely upon the skill of the mining boss and the liberality of the employer.

Fatal Accidents from Blasting.

No. 1.—October 18. Philip Ryan, a miner, aged twenty-five years, single, at the Kohinoor colliery of R. Heckscher & Co.

Philip Ryan was killed by a premature explosion. He and his partner had burned all the patent squibs they had in trying to fire a hole. They then made one of paper and hung a cotton match, dipped in oil, to it. Ryan lit the match, turned to run and fell, and before he could get up the shot exploded. He was killed by the coal being thrown upon him.

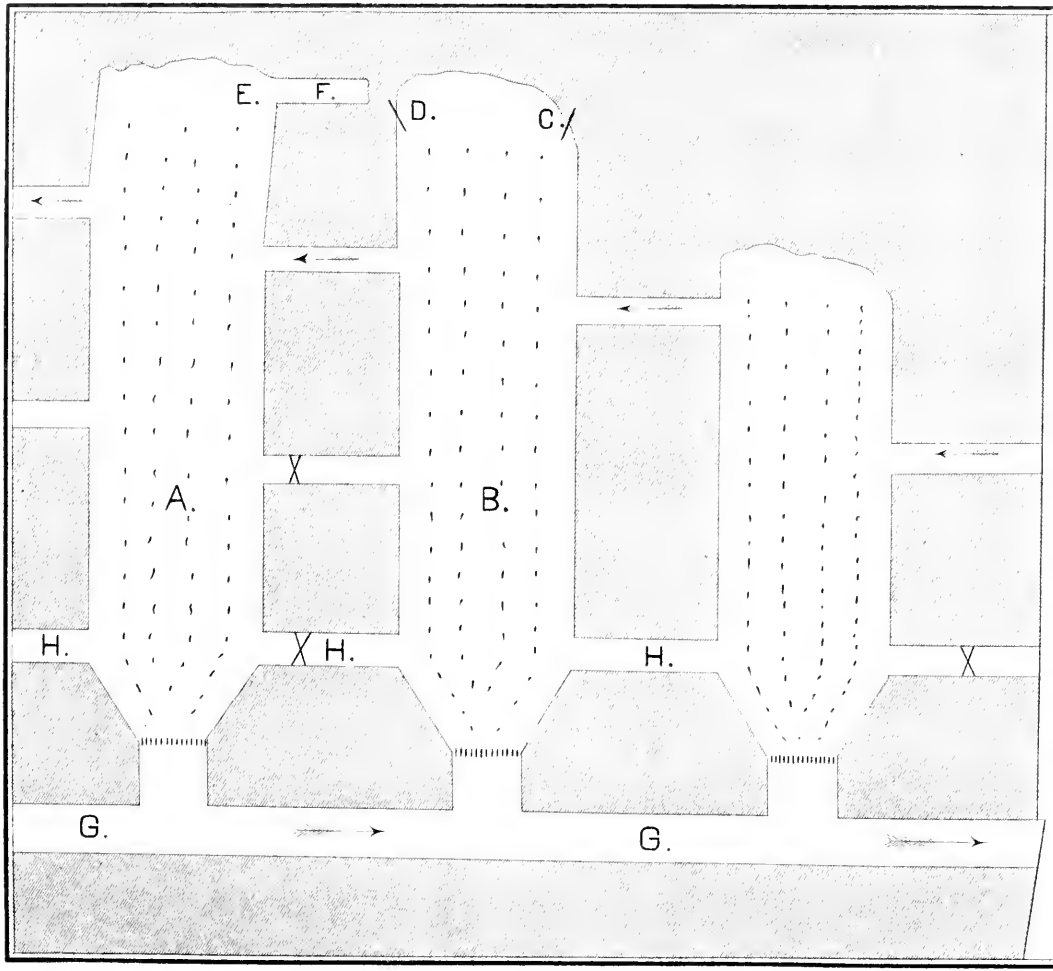
I inspected the breast for the purpose of seeing the location of the shot and place where the body was found, because I suspected that the match had been saturated with coal oil. The breast was in average condition for safety and level, or nearly so, the car running in to be loaded. The shot was in the pillar, and Ryan was killed within twelve feet of it. Upon questioning his partner very closely, he stated that he used coal oil, while Ryan used common oil, and he swore that it was common oil that had been put upon the match. I think a match of the length described, saturated with common oil, would have given a man ample time to fall, get up, and run to a place of safety. After the inquest I was of the opinion that the man had either put coal oil on the match by mistake, or some coal oil had been mixed with the common oil which he used.

No. 2.—November 26. John Madden, a miner at the Ellangowan colliery of the Philadelphia and Reading Coal and Iron Company.

John Madden was killed by a shot blowing through the end of a blind pillar-heading from the next breast.

As the accident was the result of the present loose discipline in the failure to use proper precautionary signals, necessary in such cases, a description of this accident may be of benefit as an example.

Where this accident occurred the seam dips at an angle of twenty-seven degrees. The breasts are worked from eight to ten yards wide, with a chute on each side, and the gob, composed of bony coal and other refuse, in the middle. The roof is secured by rows of props. John Madden and Patrick Winkle worked in the breast marked A on the accompanying diagram, and John Long and James Collins worked in the next breast, marked B. Madden's breast was up about sixty yards and Long's a little less. Both parties, after passing the last heading, had "leaned" on the pillar, making it less than average thickness. When Madden was some twenty yards above the heading, he commenced another and drove it about twelve feet, but,



REFERENCE OF PLAN OF BREAST WHERE JOHN MADDEN WAS KILLED IN ELLANGOWAN COLLIERY, November 26, 1881.

R. MAUCHLINE,
Inspector.

A.—Madden's Breast.

B.—Long's Breast.

C & D.—Place where Long and partner fired shots.

E.—Blind Heading of Madden's Breast.

F.—Where Madden was found.

G.—Main Gangway.

H.—Pillar Headings.

Air Stoppings.

Air Current.

thinking that Long's breast was not up far enough for him to get through the pillar, he concluded to leave it until the face of Long's breast had been brought up.

On the morning of the accident both parties went to work, with the understanding that Madden was not to work in the heading that day. Long, however, was to work on that side of his breast, for the purpose of opening the heading. Both parties were anxious to get it through, so as to have the benefit of the improved ventilation. Madden and his partner prepared a shot in the face. Long and his partner drilled two holes, (marked D and C on sketch,) one of which was at the new heading. When Madden had his shot prepared, he fired, giving the usual alarm, by crying "fire," and then went with his partner to the lower heading to "have a smoke," while the powder smoke was clearing away. As they knew that Long would soon fire, they waited. The shots in Long's breast having been prepared, Collins went down to the bottom of the breast, leaving Long to light the matches of both shots. This he did, and, crying "fire," as usual, joined his partner and waited. Only one of the shots fired. Long got another squib and went up to his breast to fire the shot which had missed, and found it to be the one on the heading side, (marked D on diagram.) In the meanwhile Madden and his partner, having heard Long's shot, which they supposed was in the heading, went up to see if it had blown through, not knowing that one of his shots had missed. While there, Long's second shot, the one in the heading, was lit and fired, and, blowing through, killed Madden.

John Madden made a mistake in going up and into the heading before knowing whether Long had more shots to fire, while Long ought to have gone to the second heading and warned Madden of the danger.

No. 3.—December 23. John Oliver, a miner, at Turkey Run colliery of Philadelphia and Reading Coal and Iron Company.

John Oliver was near-sighted, and his partner never permitted him to light the shots, for fear he would accidentally hold the lamp too near the wrong end of the match. They prepared a shot, on the day of the accident, and Oliver went down to the breast to where the oil bottle was standing, sixty feet below the face, and commenced filling his lamp. His partner lit the match and ran down to a point opposite to where Oliver was standing, but around a curve, where he was out of danger. Seeing that Oliver was in range of the shot, he told him to come over to where he was. Oliver said he would, and as he was replacing the oil bottle, preparatory to doing so the shot exploded, and a piece of coal struck him on the head, inflicting injuries from which he died on the 26th of the month.

It will be impossible to prevent accidents of this class as long as incompetent or imprudent men are employed in the mines. The three fatal accidents, under this classification, in this district this year, could all have been prevented by the exercise, on the part of the victims, of ordinary caution and forethought. If men were to sit down beside an ignited bombshell,

and, knowingly, wait to be blown to pieces, they would rightfully be considered lunatics; yet, professed miners handle powder with almost as little judgment and as great recklessness. Men who do not think, but are mere actors, are unfit to cope with the dangers of mining, and should either be compelled to leave the mines or be subjected to much more rigid discipline than is now enforced. The first accident reported was caused by putting coal oil on to the match. The person who so used it must have been entirely ignorant of its nature. I have objected to the use of this light in the collieries of the district for this and other reasons, and have succeeded in having its use, in many of them, stopped, and hope, before many months, to succeed in removing it entirely from those still using it. I have seen boys in the mines, whose clothes were so thoroughly saturated with coal oil, that, if a match had been applied to them, they must have been consumed in spite of all efforts to save them.

Fatal Accidents from Machinery.

No. 1.—April 5. Matthew Burns, a laborer, aged twenty years, unmarried; at the Cuyler colliery of S. M. Heaton & Co.

Matthew Burns was attending a small steam-pump, and was unaccustomed to working in the mines. His light became extinguished, and, becoming confused in the dark, he stumbled and fell with his hands into a small pool of hot water covering the nozzle of the exhaust pipe. He was not considered dangerously injured at the time, but died in two days.

No. 2.—July 4. Thomas Rourke, cart-driver, aged thirty years, wife and two children; at the Boston Run colliery of the Philadelphia and Reading Coal and Iron Company.

Thomas Rourke was hauling ashes from the boilers, in his brother's place, who had gone to a pic-nic. While he was loading in front of the boilers, one of them exploded and killed him.

No. 3.—October 19. George Berdanier, a slate-picker, aged thirteen years; at the Draper colliery of J. Milnes & Co.

George Berdanier was sent after a piece of sheet-iron, with which to repair a chute. Before returning to his seat, he climbed up on a piece of timber to see what the boss was doing in the chute, when a bolt of the screen caught his clothing, and, before the machinery could be stopped, he received injuries from which he died the next day.

It is a matter of congratulation, that, with thousands of boys employed about the screening machinery in the breakers of this district, but a single life was lost in 1881. It also proves that the discipline is being made more stringent. Persons in charge of breakers should be made to appreciate the truth that boys are unable to take proper care of themselves, and that they must be protected by the careful fencing off of every probable cause of danger, such as belts, &c.

The one fatal accident, caused by a boiler explosion, may be charged to a defective method of setting boilers, which has now been abandoned. The accident to the pump-boy was another example of the folly of employing

persons for, and the danger of such persons accepting, situations for which they are not qualified.

The Difficulty Experienced in Enforcing the Mine Law.

The difficulty experienced in enforcing the provisions of the mine ventilation act operates in no small degree to detract from the benefit that would otherwise be derived from it. I have no complaint to make of the spirit in which any suggestion, as to improvements, that I have considered it necessary to make, have been received by the mine officers, or of delay in carrying them into execution. The law, however, is sometimes violated, and it then becomes necessary to bring a prosecution, and, when this occurs, the delays that, upon one pretext or another, are interposed, postpone the trial from term to term, to so late a date that, when a conviction is secured, the good effect that would have followed had punishment been prompt, is, in a great measure, neutralized. The companies have attorneys engaged, and while it is, doubtless, their duty to do all in their power for the clients, the great delays they accomplish are very injurious. This could be remedied by a thorough revision of the mine law, which should be commenced at once, under the auspices of a commission, composed of operators, miners, mine inspectors, and lawyers. The bill, when finished, should not only thoroughly meet all the requirements of our present system of mining, but also be carefully framed from a legal standpoint, that the obscurity in wording of the present law, and its amendments, may be avoided, and as little ground as possible given for differences of opinion as to its provisions. The new bill should define the limit of punishment—the imprisonment need not be for a longer period than three months, nor the fine more than $100—and then authorize justices of the peace to impose fines and short sentences of imprisonment, upon a charge by the mine inspector, properly supported by testimony, which could be appealed from, under proper restrictions. This would save trouble and expense, and make the mine act what it is intended to be, a means for the prompt enforcement of strict discipline.

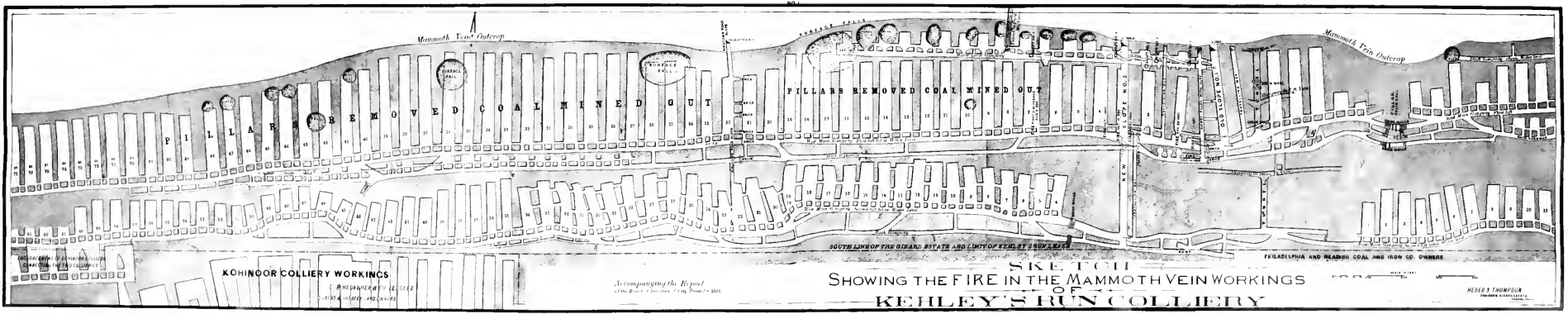
The law certainly needs revision, not only in this particular, but in many others, and the operators will be benefited, as much as will those they employ, by the proposed changes. When the present law was passed it was denounced as "class legislation" by some of those identified with the capital invested in coal mining, but experience has since proven that the improvement it has effected in the condition and discipline of the collieries has cheapened the cost of production, proportionately, as much as it has reduced the ratio of accidents. An explosion of gas may not only kill a miner or two, but it may set fire to a colliery and entail a loss of thousands of dollars, and any of the safety appliances required by law about colliery machinery save large sums of money, as well as valuable lives. And if it has proven more profitable to mine coal in the immediate past, under the operation of a mine law, it will certainly be still more profitable in the future, as our mines are sunk deeper, since the risk of serious accidents increases with the greater depth attained.

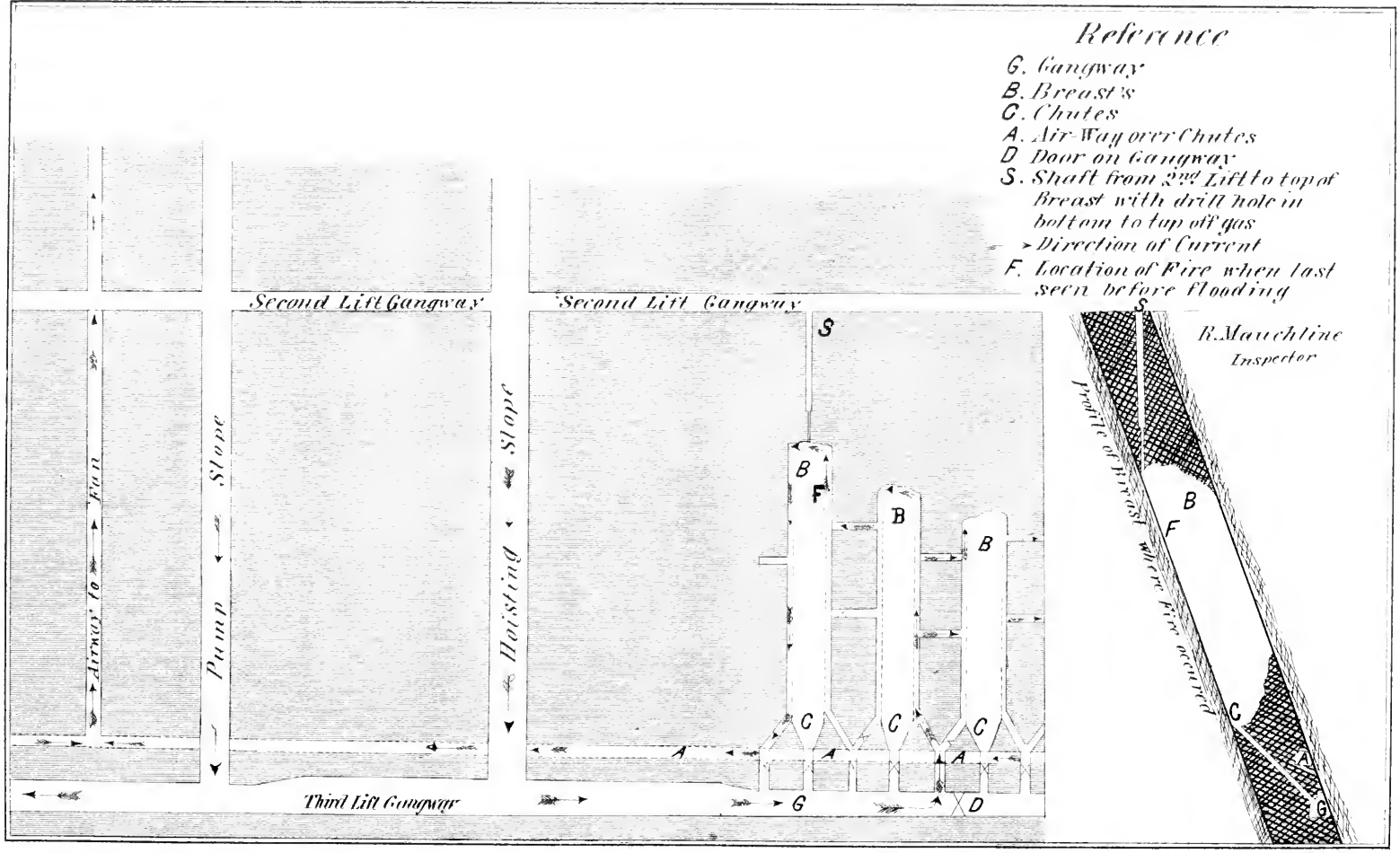
The Kehley's Run Colliery Fire.

In the last annual report, the events attending the progress made in extinguishing the Kehley's Run colliery fire were described in detail up to December 13, when the court ordered that "the city of Philadelphia shall have full permission to make earnest efforts to extinguish the fire in said Kehley's Run colliery, but it is directed that the order filed November 24, 1880, be constantly, carefully, and faithfully observed."

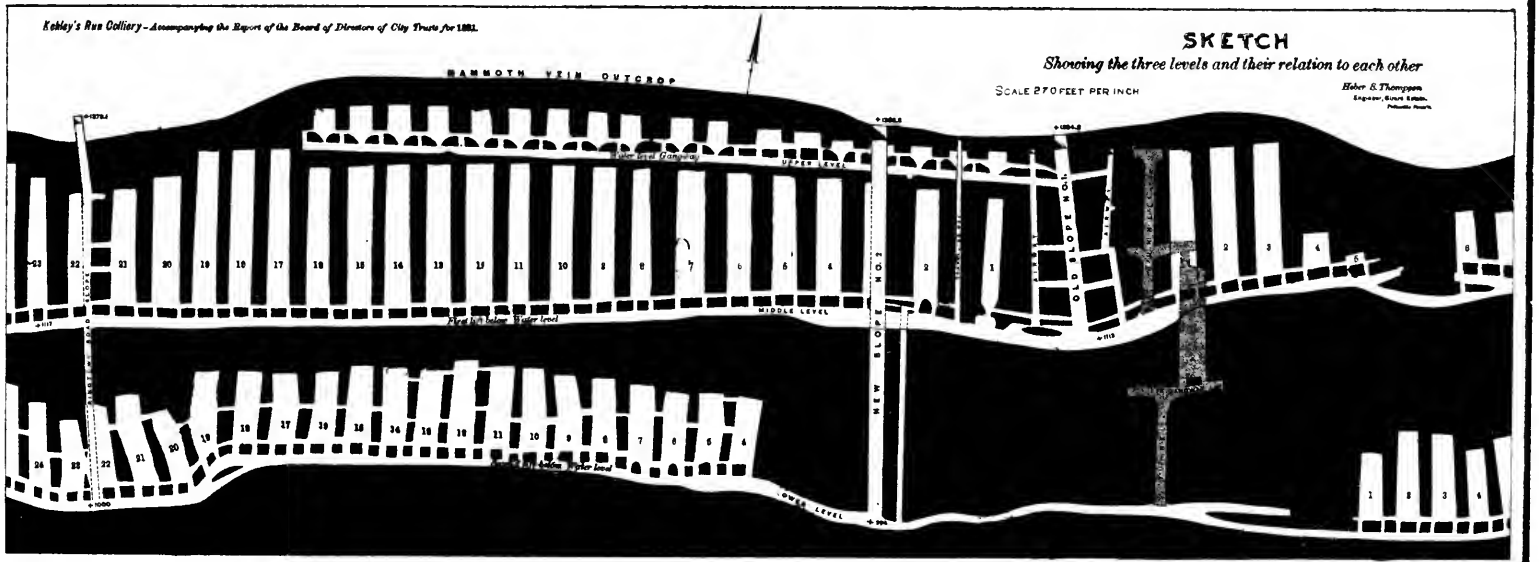
Up to this time, four months have been spent in vain efforts to overcome the fire. Hose attached to the column pipe, sealing the fire as near as possible from the air, and injecting steam, and finally the introduction of carbonic acid and nitrogen gases, had all been tried and abandoned. A large force of men was employed filling the crop holes, to make them air-tight, but the fire continued to steadily force its way nearer to the hoisting slope. The batteries in the gangway erected up to this time were but temporary affairs made of props and plank, which freely admitted the air, and were burned out as soon as the fire came in contact with them. Several of these wooden batteries were built, and burned down almost as soon as completed. The fire seemed to be obtaining plenty of air, as it steadily increased in volume and intensity, as was proven by the large and increasing volumes of smoke issuing from the openings made by the falling in of the surface.

It was evident that a more effective plan of fighting the fire must be devised, or the hoisting slope, which was the only convenient avenue by which materials for the construction of dams on the east side of the fire, for the purpose of flooding the workings could be introduced, would be lost, and thereby a great deal of additional labor and expense entailed. The former management had been advised to put an arch of heavy timber or brick in the new slope and airway, just below the old slope gangway, capable of standing the pressure of water necessary to flood the mine, and plans for the purpose had been prepared by Mr. Thompson. Unfortunately the contract with the parties who had engaged to extinguish the fire, by introducing gases, gave them entire control for the time, and had an attempt been made to put in the battery, it would have furnished grounds for a suit for damages. Valuable time was thus lost, and a large additional expenditure made necessary. Afterwards a temporary dam was put in, consisting of a row of eight props, let into the solid top and bottom. Five feet below these, three props were placed as backing to the first row, and braced, to bind the whole strongly together. Planks were then placed on the props, and on the planks floor-boards, and the whole was covered with a coating of cement. The slope and air-way were then filled to the level of the gangway with clay. This dam was put in at great risk, as the fire was close by, and an explosion might have occurred at any moment, or a fall of top might have driven the gases down on those at work on it. It was, therefore, placed hurriedly in position, and was necessarily imperfect, and unfit to withstand great pressure. It was thought to be strong enough, how-


Mammoth Vein Outcrop
PILLARS REMOVED COAL MINED OUT
Mammoth Vein Outcrop
PILLARS REMOVED COAL MINED OUT
SOUTH LINE OF THE GIRARD ESTATE AND LIMIT OF KEHLEY RUN LEASE
PHILADELPHIA AND READING COAL AND IRON CO. OWNERS
KOHINOOR COLLIERY WORKINGS
SKETCH
SHOWING THE FIRE IN THE MAMMOTH VEIN WORKINGS
OF
KEHLEY'S RUN COLLIERY
Accompanying the Report
MEYER & THOMPSON


Reference
G. Gangway
B. Breasts
C. Chutes
A. Air-Way over Chutes
D Door on Gangway
S. Shaft from 2nd Lift to top of Breast with drill hole in bottom to tap off gas
Direction of Current
F. Location of Fire when last seen before flooding
Second Lift Gangway
Second Lift Gangway
Air-Way to Fan
Pump Slope
Hoisting Slope
Third Lift Gangway
S
B
F
B
B
C
C
C
A
A
A
G
D
R. Mauchline
Inspector
Profile of Levels where Fire occurred
S
B
F
C
A
G

NO. III


Kehley's Run Colliery – Accompanying the Report of the Board of Directors of City Trusts for 1881.
SKETCH
Showing the three levels and their relation to each other
SCALE 270 FEET PER INCH
Heber S. Thompson
MAMMOTH VEIN OUTCROP
UPPER LEVEL
MIDDLE LEVEL
LOWER LEVEL
NEW SLOPE NO. 2
OLD SLOPE NO. 1
Water level Gangway
Fired Pit below Water level
Fired Pit below Water level

ever, to hold water as high as the top of the gangway, and thus keep the fire in the breasts. With this object in view, another dam, of similar construction, was placed west of the old slope, and the water thereby raised a few feet on the gangway. This body of water, some seven feet deep near the old slope, and extending along the gangway to the plank battery at breast No. 22, under the Ringtown road, suddenly disappeared.

It either found its way through the batteries in the new slope or through fissures in the chain pillar into the lower lift. This water made its way into the Kohinoor, and stopped that colliery for a time. The court restrained the raising of the water in the Kehley Run old slope level to more than thirty-five feet vertical for a time, for fear it would burst the dam in the new slope and flood the Kohinoor colliery, but reserved the right to change this order after permanent dams should be constructed. The owners of the Kohinoor colliery knew that should the Kehley's Run workings be filled with water, that the inspector would probably prevent their colliery from working until at least a portion of the water was removed, hence their application for an injunction to prevent the flooding of the mine.

The fire had reached the last battery east of the hoisting slope, and men were endeavoring to save it with hose attached to the pump column, as, had it been destroyed, there would have been nothing but an open space ninety-five feet in length between the turnout, which was full to the roof of red-hot coal, and the slope. To make it possible to do this, a current of air was carried across the turnout in front of the fire to keep the gases generated back from the slope bottom. At this time men could not have been induced to enter the mine, if there had not been a way of egress on the east, and every time a rush of hot coals came down from the breasts, they were compelled to run into the east gangway, and wait until it settled before returning. The battery had been partially burned out, and the mass of glowing coal, that could be seen for some distance, as the top coal had fallen over the turnout, presented a magnificent sight.

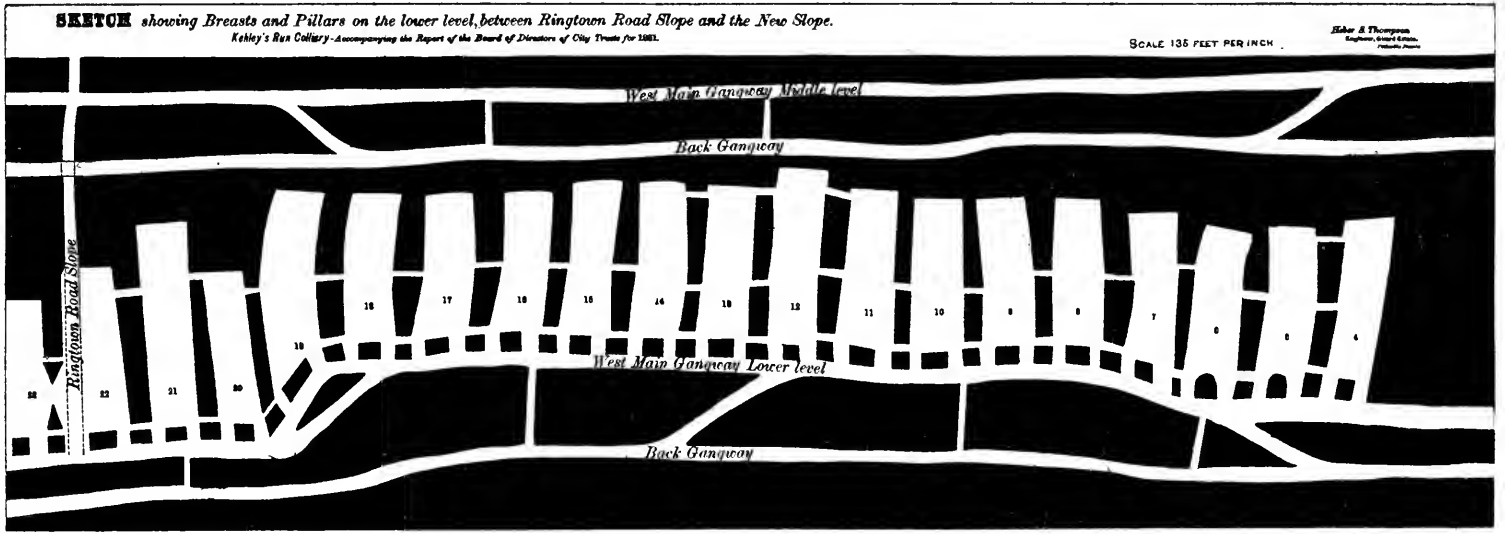
The lessees, discouraged by their failure to conquer the fire, and by the great expense the undertaking promised to involve, surrendered their lease, and on the 14th of December Mr. Heber S. Thompson, the engineer of the Girard estate, took charge for the board of directors of the city trusts. Major Thompson, who stands at the head of his profession, and whose abilities were fully equal to the requirements of the undertaking, at once made a complete change in the methods of dealing with the fire. From the date upon which he assumed control it was evident the day of half measures was past, and that the fire would be put out if it was within the range of engineering skill; and that if it was not extinguished it would be confined between comparatively contracted limits, and the underlying seams and the Mammoth, on both sides of the burning section, saved from injury. The Philadelphia and Reading Coal and Iron Company having tendered the services of Mr. William Booth, of Shamokin, one of their inspectors, he was placed in charge. Mr. Thomas Baird was continued as

inside boss, and Mr. John Daddow as outside boss. Mr. Oscar Wormelsdorf, of Pottsville, was appointed clerk. Mr. William G. Gwyther, of Girardsville, mine inspector for the Girard estate, assisted when his services were required.

The fire had reached breast No. 1, and the headings leading to the fanway, and within two days of the change of management, broke into the fanway, six yards from the slope, through a heading connected with a top breast, worked over the gangway, which, before this, was not known to be on fire. In the meantime a dam of brick and cement, four feet in thickness, and arched to resist pressure from the Buck mountain seam, was being built in the tunnel to the Buck mountain seam, for the purpose of damming back the water and cutting off communication with the seam on fire. This dam was about half completed, when, on December 17, at three o'clock, A. M., the fire broke into the airway connecting the new slope airway with the fan, the draft of the fan drawing the smoke and flame across the overcast, (see sketch No. 7,) and up the fanway parallel with the slope. The pump-house was an opening connecting the slope and airway, with a plank stopping behind the pump. This caught fire, and the flames extended half way through the pump-house. It seemed as if nothing could prevent the flames from catching the slope timbers, as the pump-house opens into it. The men who were in charge at the time, knowing that an explosion might happen at any moment, and expecting every minute to see the slope above them fill with smoke and flames, fell back to the east gangway by which they could reach the surface through the east traveling way. Messrs. Booth and Baird had been notified, and on their arrival the former assumed charge on top and the latter below. Mr. Booth tore down the fan-house and fan, and covered the mouth of the fanway with plank and clay to prevent the current from carrying the fire to the surface, and, perhaps, destroying the buildings. Mr. Baird found it impossible to get down the slope, owing to the smoke, and went down by the east traveling way. On the gangway he met the men on their way out, who informed him that the slope was lost. It was fortunate he was compelled to go this way, as, had he gone down the slope, when he reached the bottom, there would have been no one there to help him; and before he could have come up again and obtained men it would have been too late. As it was, he induced the men to return, and at great risk, fought the fire out of the pump-house, and thus saved the hoisting slope. Great praise is due Mr. Baird for his bravery and promptitude on this occasion, as, had he not succeeded in driving the fire out of the pump-house with the hose, the pump would have been destroyed, the hose rendered useless for want of water, and the hoisting slope and a large section of the seam burned, which were eventually saved.

The next morning all hands were put to work cutting out foundations and erecting dams in front of the fire to hold it in check, until such time as the permanent dams could be erected. Brick and cement arches, five

NO. VII


SKETCH showing Breasts and Pillars on the lower level, between Ringtown Road Slope and the New Slope.
Kehley's Run Colliery - Accompanying the Report of the Board of Directors of City Trusts for 1881.
SCALE 135 FEET PER INCH
Baker & Thompson
West Main Gangway Middle Level
Back Gangway
Ringtown Road Slope
West Main Gangway Lower level
Back Gangway

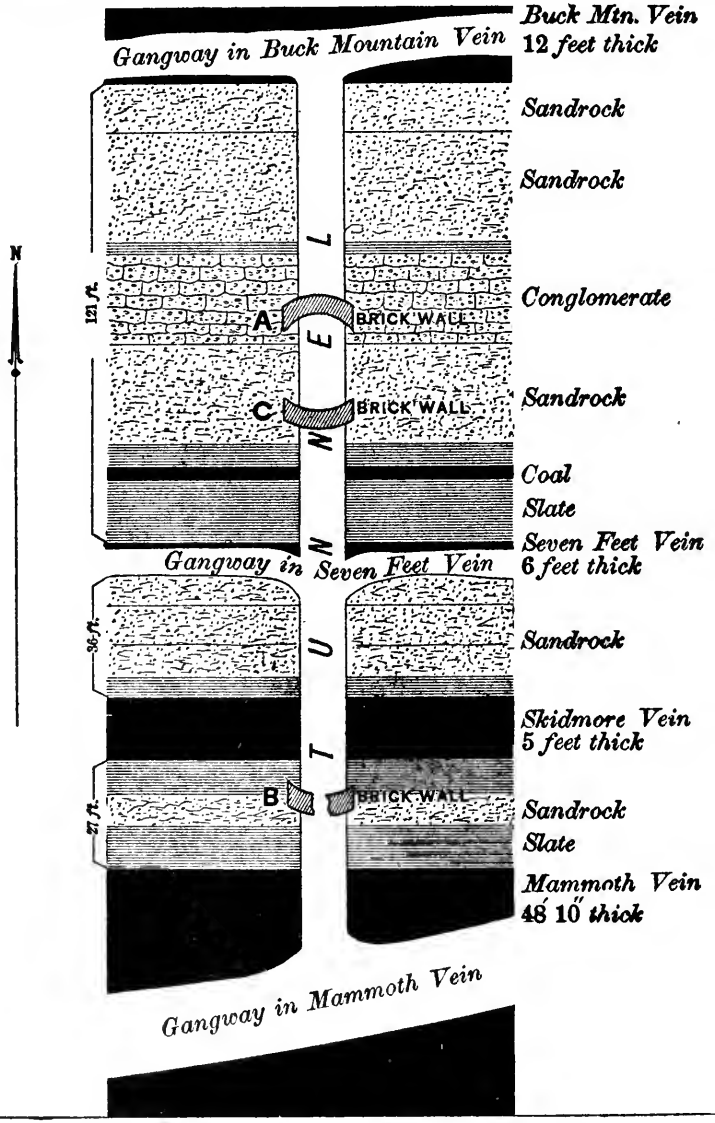
SKETCH

Showing the Mammoth, Skidmore, Seven Ft. and Buck Mt. Veins, and the Brick Walls built in the Tunnel connecting them

Heber S. Thompson, Engineer, Girard Estate.
Pottsville, Penn'a.

Kehley's Run Colliery

Accompanying the Report of the Board of Directors of City Trusts for 1881.



SECTION

SHOWING THE AIRWAY AND OVERCAST

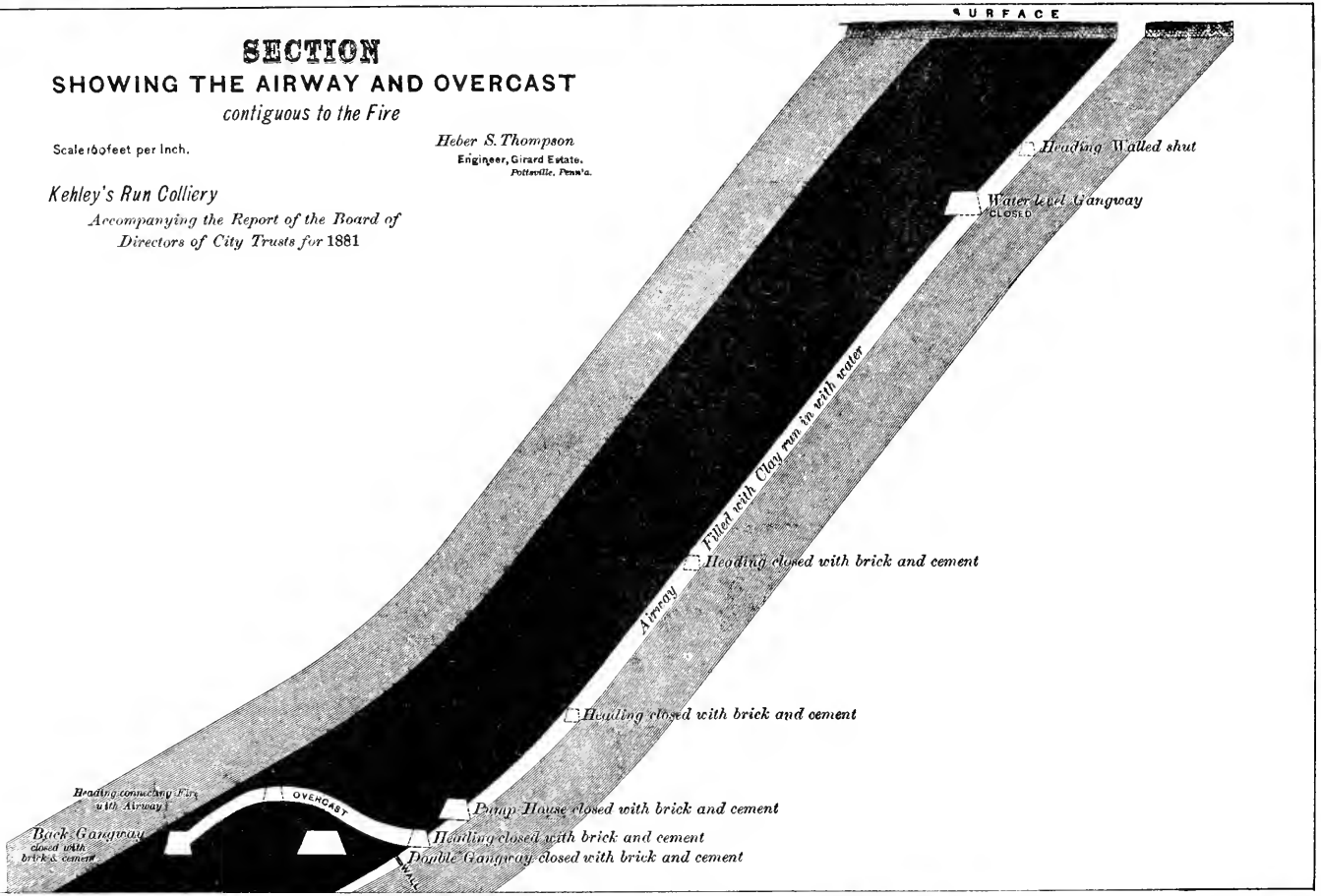
contiguous to the Fire

Scale 100 feet per Inch.

Heber S. Thompson
Engineer, Girard Estate.
Pottsville, Penn'a.

Kehley's Run Colliery

Accompanying the Report of the Board of Directors of City Trusts for 1881



feet in thickness, were erected as follows: (See map.) 1, in the back gangway; 2, in the airing from the new slope, (see section showing air-way and over-cast;) 3, across the turn-out, just outside the stables; 4, in the heading below the pump; 5, in the back end of the pump-house, and in all the headings on the west side of the hoisting slope. The fire was now inclosed on the east side of the brick-work, five feet in thickness, except in the old water level, which, from the broken condition of the pillars, could not be built up. To prevent the fire from making its way up the fan-way and getting into the water level workings, it was filled with earth, run in with a stream of water from the pump. Two thousand cart loads of clay and earth were required to fill it. This sealing of the fire, on the side next to the hoisting slope, was the first real check in its progress, and there was an immediate falling off in the volume of smoke issuing from the crop holes.

The work of erecting the dams now proceeded without further delay. The question to be solved was, could the mine be flooded before the fire extended above the point where water would cover it. If the time occupied in getting ready permitted the fire to reach the workings above water level, then it might become necessary to leave the water in the colliery for years, and to cut the seam on each side of the section on fire. These cuttings could be filled with clay to form barriers, and the portion of the seam on fire be left to burn itself out from the water's edge up to the crop. Fortunately this did not become necessary. To take the risk of filling the workings of the colliery for a distance of sixteen hundred feet, to a height higher than the highest church steeple in town, while two hundred men and boys were working in the Kohinoor colliery, five hundred feet below, the workings of the two collieries being connected, was bad enough, but if the water had to be kept there for an indefinite period, it would have been worse.

The dam which the lessees were building in the Buck Mountain tunnel at the time they surrendered their lease, was now completed by Mr. Thompson. To secure strength, the conglomerate rock at the top and bottom was cut out eighteen inches, and on the sides twenty-four inches. The arch was five feet thick, with the convex side facing the Buck Mountain seam. (See sketch No. 5.) A similar arch, facing the Mammoth, was built at the mouth of the tunnel. These extraordinary precautions were taken to effectively secure the underlying seams against fire or water, in case the fire could not be extinguished by flooding. In that case the Buck Mountain seam could be worked by sinking a slope on it.

A clear understanding of the plan adopted to inclose the section of the mine to be flooded may be obtained by an examination of the accompanying map by Major Thompson. The points marked A, B, F, show the position of the dams on the old slope level, and the point G the position of the two dams in the lower lift gangways. The construction of each dam is shown in the sketches attached.

One hundred and fifty yards east of the hoisting slope there is a section

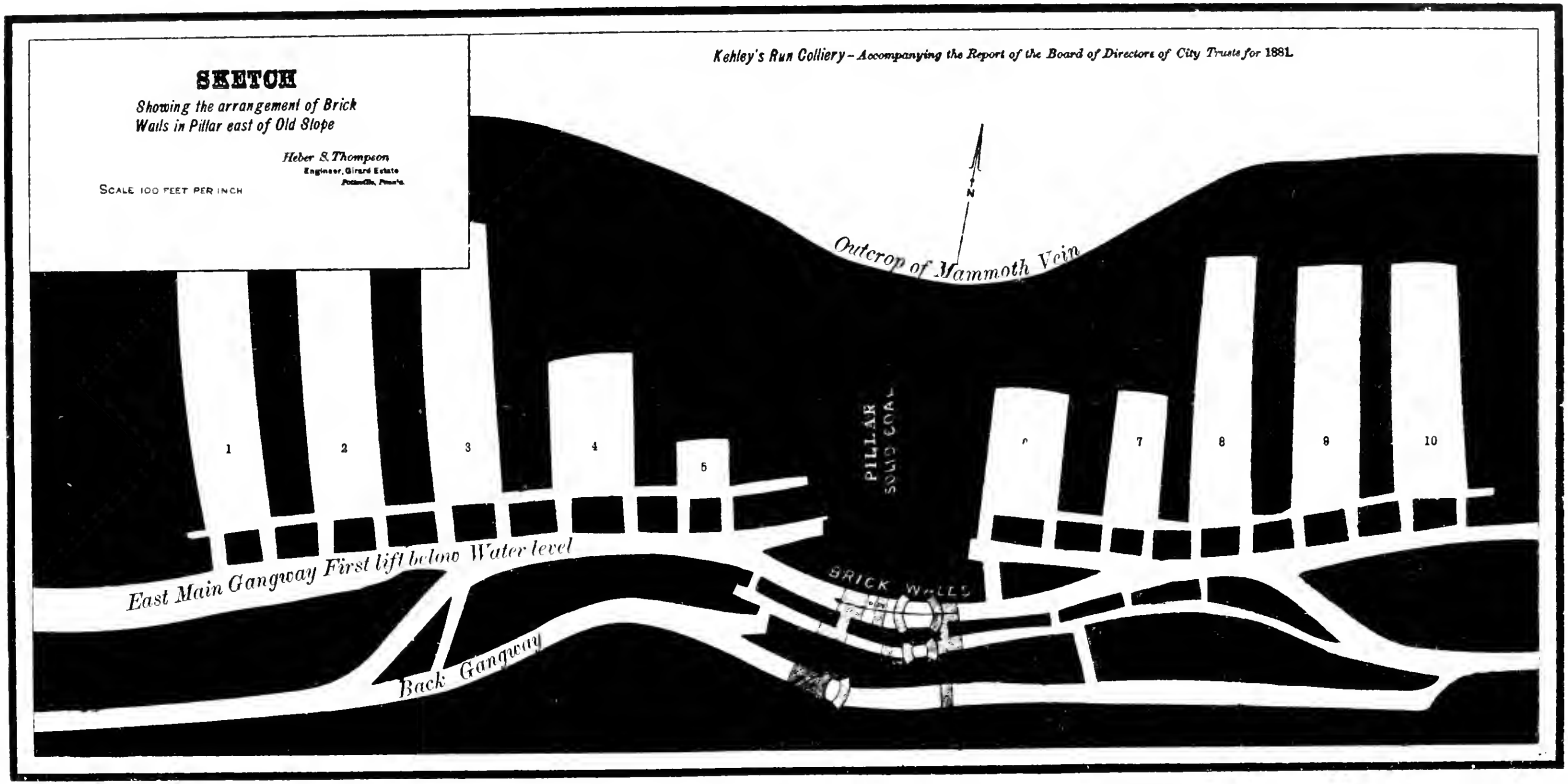
of the seam with no breasts worked, because the seam was in fault. There were two gangways and an airway at this point. The dams were built (see sketch No. 4) as follows:

First. Fourteen feet in thickness of square brickwork to protect the arches from fire; a five-feet arch facing the west to resist pressure when the mine was flooded, and a similar arch, facing the east, to resist pressure when the water rose in that section of the mine. In all, a space of over thirty feet of the gangway was filled with dams and brickwork. A six-inch pipe and Ludlow valve was built into the arches and stoppings of the front gangway to tap the water when it would be desired to remove it. Although these dams required a large quantity of brick and cement in their construction, the fact that the material could be sent down the slope in cars and run into the point at which it was needed, greatly expedited their construction. The dams on the west of the fire were more difficult to construct, as there was no way of getting down the material to the places at which it was needed.

Where the Ringtown road passes up the Mahanoy mountain and crosses the workings of the colliery, a pillar had been left between breasts Nos. 21 and 22 to support the road, (see A and B on the map,) and as this was the only solid place, it was selected as the site for the proposed dams. To get down the brick and cement a slope was driven through to the surface and hoisting plant placed in position. A Grice & Long mining locomotive, that had been used in the colliery, was improvised into a hoisting-engine for lowering material to the dams. The two gangways and the pillar-headings were then built up with brick arches. (See sketch No. —.) Meanwhile the temporary slope was sunk into the lower lift, and, at five hundred and ninety-nine feet from the top, the surface of the water, at the level at which it ran over the summit of the graded gangway below and into the workings of the Kohinoor colliery, was reached. (See vertical section No. 6.) A Cameron pump was placed in position, steam was brought from the new slope boilers, a distance of eighteen hundred feet, in wrought-iron pipes, and this large body of water was removed in three months. The water was forced up to the old slope level and then carried in troughs west until it ran into Kohinoor colliery.

An examination of the pillars of the lower lift proved that the best point for these dams, which would be subjected to nearly double the pressure of those in the middle lift, was opposite a pillar one hundred and sixty feet wide, which had been left on the west side of the new slope. Whether they could be placed here or not, depended upon the strength of the chain pillar between the two lifts. To find the thickness of this pillar, Mr. Thompson had a special survey carried down the temporary slope, and into all the breasts. Levels were taken at the face of each breast, and measurements carefully made. These were compared with the mine surveys, and also with the measurements paid for in working the breasts, as they appeared on the colliery books. All seemed to coincide.

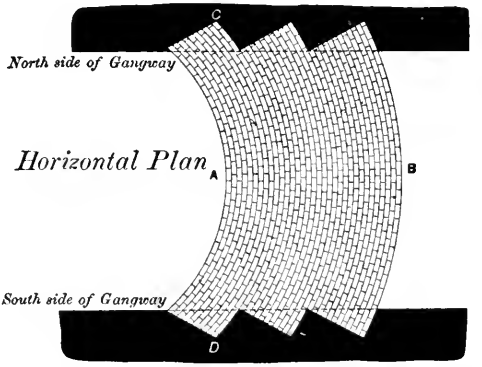
NO. IV

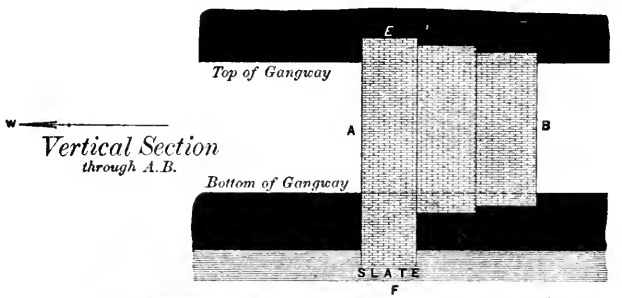

SKETCH
Showing the arrangement of Brick Walls in Pillar east of Old Slope
Heber S. Thompson
Engineer, Girard Estate
Pottsville, Penn'a.
SCALE 100 FEET PER INCH
Kehley's Run Colliery – Accompanying the Report of the Board of Directors of City Trusts for 1881.
N
Outcrop of Mammoth Vein
1
2
3
4
5
PILLAR
SOLID COAL
7
8
9
10
East Main Gangway First lift below Water level
BRICK WALLS
Back Gangway

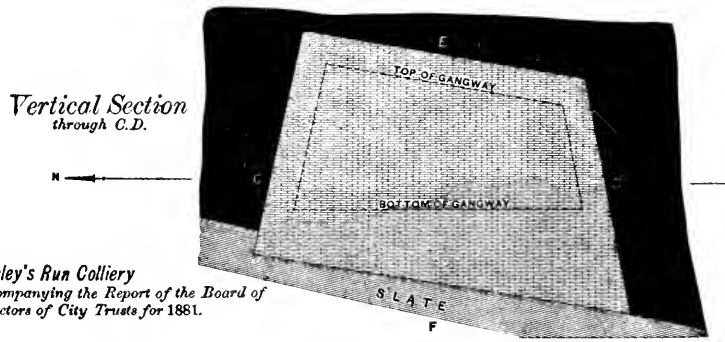
SKETCH *showing Brick Walls in the West Main Gangway lower level.*

Heber S. Thompson
Engineer, Girard Estate.
Girardville, Penn'a.

SCALE 10 FEET PER INCH

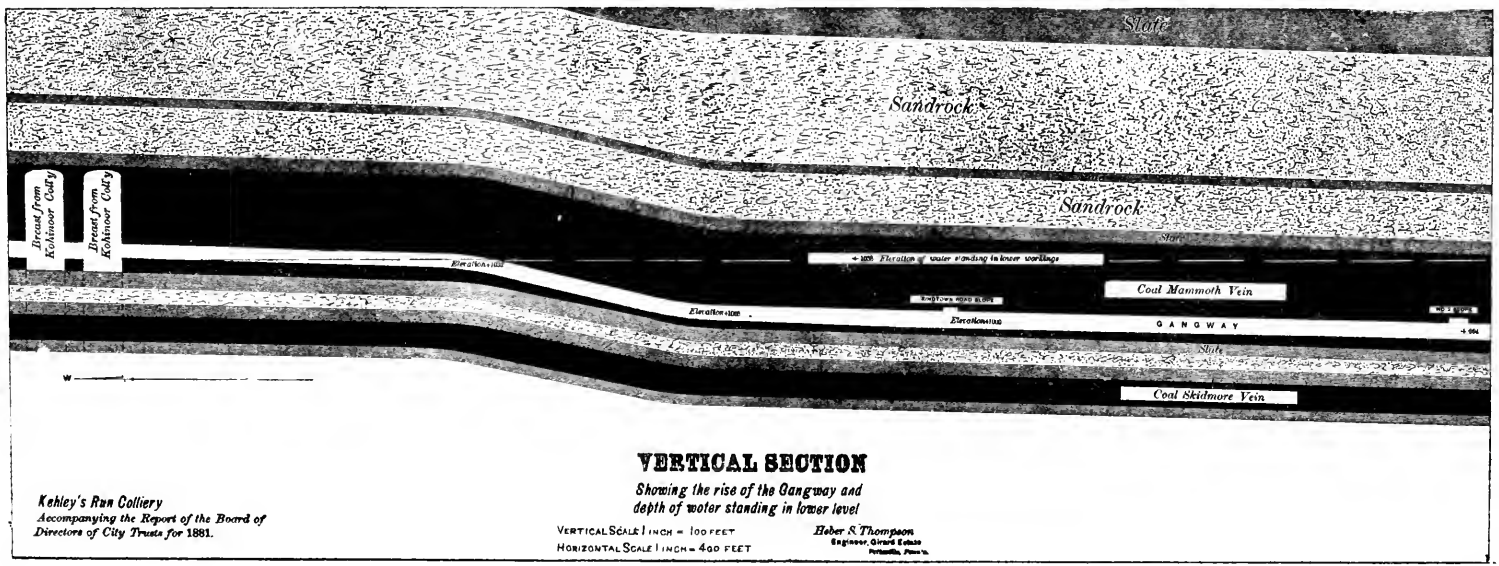






Kehley's Run Colliery
Accompanying the Report of the Board of Directors of City Trusts for 1881.

NO.VI



VERTICAL SECTION

Showing the rise of the Gangway and depth of water standing in lower level

Kehley's Run Colliery
Accompanying the Report of the Board of Directors of City Trusts for 1881.

VERTICAL SCALE 1 INCH = 100 FEET
HORIZONTAL SCALE 1 INCH = 400 FEET

Heber S. Thompson
Engineer, Girard Estate
Pottsville, Penn'a.

NO. VIII.

SECTION
THROUGH BREAST 12.

West Gangway lower level

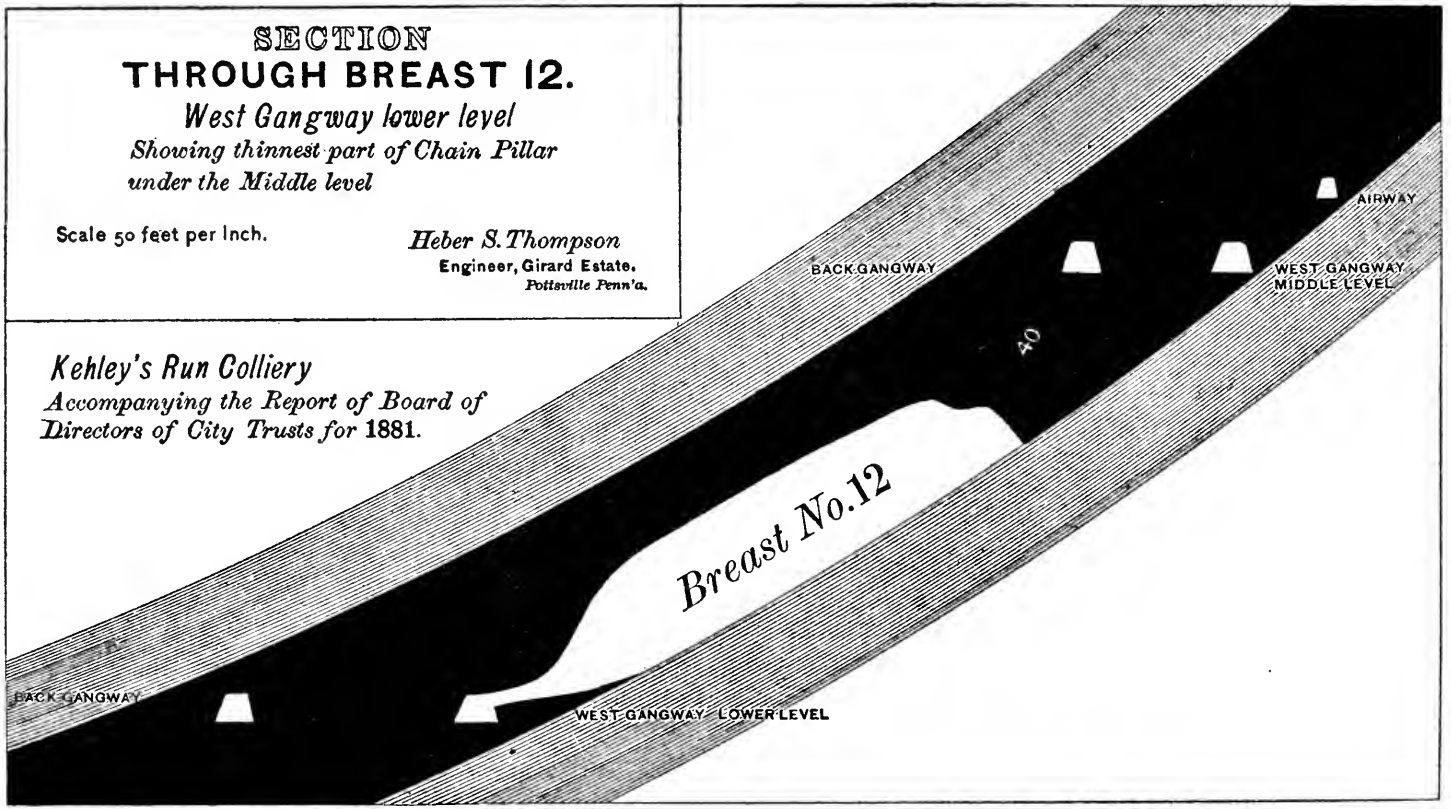
Showing thinnest part of Chain Pillar under the Middle level

Scale 50 feet per Inch.

Heber S. Thompson
Engineer, Girard Estate.
Pottsville Penn'a.

Kehley's Run Colliery

Accompanying the Report of Board of Directors of City Trusts for 1881.



Sketch No. 7, is a horizontal plan, showing the breasts and pillars of coal between them. Profile plans were also made, showing a thickness of the chain pillar ranging from ninety feet down to forty feet; the thinnest point being over breast No. 12, where there was forty feet of solid coal to the top slate gangway, (see sketch No. 8.) This was considered sufficiently strong.

The dams on the lower gangways, at the points proposed, (marked G on map,) were commenced after a temporary structure had been erected to keep the water back until the brick work reached the roof. These dams, as shown on sketch No. 9, were erected with great care. The front or bottom slate gangway is eighteen feet wide and ten feet high, and the back or top slate gangway is seven feet wide and eight feet high. To secure a firm foundation, the bottom was taken out in the front gangway, eight feet six inches, or until the rock was reached, and in the back gangway, three feet. On the top the dams were let into the coal two feet, and on the sides two feet six inches, all the cutting being done with the pick, as blasting might have shattered the coal. These dams were built in three sections, as shown in the sketch, with a radius of fifteen feet, the convex side facing the east, to resist the pressure, each section being five feet thick, and lapping the other. Nearly two hundred thousand bricks and six hundred barrels of cement, half American and half imported, were used in their construction. A water-flume, three feet wide, one foot deep, and two thousand three hundred and sixty feet in length, was then built from the colliery to the reservoir of the Shenandoah Water Company, on Kehley's run, to carry the water to flood the mine.

On Friday, June 10, six months after Mr. Thompson commenced operations, the brick work was completed, the pump and other plant had been removed, and all was ready to run in the water. Two days previous the water, which had accumulated east of the eastern dams, was let in by opening the valve, the water passing into the lower lift, through the workings of the seven-foot seam. This volume of water, by filling up the lower workings and compressing the air against the lower side of the plank dam in the new slope, assisted to support it against the weight of water from above, and probably saved it from destruction. When the east side water was exhausted, the valve was closed, and the water run in from the surface. A small stream from the Ringtown road was also turned in on the west end of the enclosure.

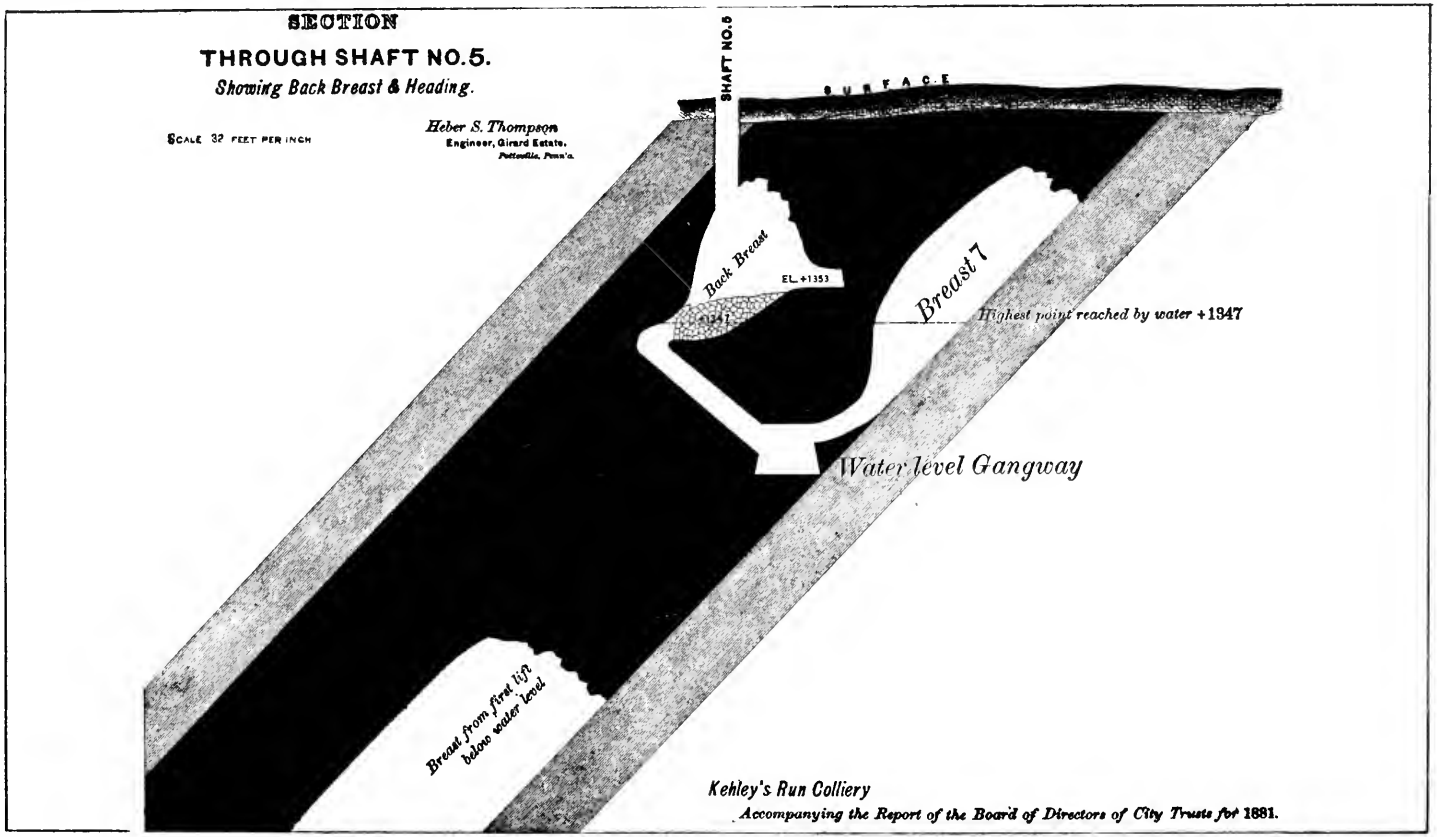
The large flume discharged $666\frac{2}{3}$ cubic feet per minute, or 960,000 cubic feet per day, and from all sources, 1,070,880 cubic feet, or 8,031,600 gallons, of water run into the colliery each day.

The pressure the dams in the middle lift and the chain pillar were subjected to was $6\frac{3}{8}$ tons per square foot, or 88.9 pounds per square inch. The pressure upon the dams in the lower lift was equal to $10\frac{3}{8\,0}$ tons per square foot, or 141.27 pounds per square inch. Owing to their construction they could have withstood a much greater pressure.

The order of court, restraining the flooding of the mine more than thirty-five feet vertical, was still in force when all was ready, and it was necessary to have it modified. I was in court when the case was argued. Mr. Thompson's witnesses testified that there would be no danger from flooding the mine to those working in the Kohinoor colliery, while counsel for the owners of the Kohinoor colliery endeavored to prove the contrary with a view of preventing the flooding or obtaining grounds on which to base a suit for damages. The Court, however, decided in favor of the flooding, the water was turned on and was rising very fast.

After mature consideration, I concluded to stop the men from entering the Kohinoor workings after the batteries had taken about three quarters the pressure, and to continue to keep them out until the water had risen to the full heighth and had somewhat receded, thus allowing a margin, determined by experiment, as a factor of safety. I had every confidence in the strength of the dams, but as the point of least resistance was supposed to be the chain pillar, I thought it best not to risk two hundred lives on mere opinion. I was anxious to learn how rapidly the water was rising, and on the evening of June 14 I visited the colliery. Mr. Baird, who was in charge, informed me that his instructions were to furnish no information, and on my requsting that a car be let down to ascertain the water-level, he said the boilers were blown off and the fires out. I obtained a short piece of inch gas pipe and a cord, and, with Mr. Baird's assistance, ran it down the speaking tube. This was at nine o'clock in the evening, and the water proved to be up one hundred and forty feet on the hoisting slope, rising at the rate of half foot each hour. The same evening, in company with William Pooler, inside boss, I visited the Kohinoor colliery and notified the night engineer to order the fire boss, when he reported in the morning, to close all doors and put everything in order, and to allow no person to go down until I arrived. I was at the head of the shaft by six, A. M., and told the men that I did not want them to go down until such time as the batteries had received the full pressure and some of it had been removed. They all agreed to stop. I then notified the inside fan engineer to oil his fan and come out with me, ordering him to go in but twice a day. Similar orders were given to the stable boss. The Kehley run workings were filled twenty feet above water-level, when the water broke through the top of the breasts in the Kehley's run ravine and then receded to water-level. This I considered a sufficient margin for a factor of safety, and I, therefore, permitted the Kohinoor colliery to resume.

Trial shafts were now sunk to the level of the water along the crop, above the breasts, which had been involved in the fire. These shafts were connected by headings to determine if there was any fire above the surface of the water. (See section No. 10.) Nothing but heated strata were found, and as the shafts tapped the inclosed gases, the temperature gradually fell. The temperature of the water, a month after the mine was filled, was, at some points, 130° Fahrenheit, and large volumes of vapor were given off from its surface.


SECTION
THROUGH SHAFT NO.5.
Showing Back Breast & Heading.
SCALE 32 FEET PER INCH
Heber S. Thompson
Engineer, Girard Estate.
Pottsville, Penn'a.
SHAFT NO.5
SURFACE
Back Breast
EL.+1353
Breast
Highest point reached by water +1347
Water level Gangway
Breast from first lift below water level
Kehley's Run Colliery
Accompanying the Report of the Board of Directors of City Trusts for 1881.

On August 26, hoisting out the water commenced with two tanks, one of eighteen hundred and the other of eight hundred gallons capacity. Over twenty-six hundred gallons were raised every three minutes. When the tanks were down to a point sixteen feet above the pump-house, it was found that loose coal had blocked the slope track, and a pump was taken down to pump into the tanks until the steam pump was reached and started. After the pump was started, the valve in the dam on the east gangway was opened, and the water east was taken out. A hole was then drilled through the tunnel dams, and the water in the Buck mountain seam also taken out. The dams are now being removed by blasting, and other preparations are being made to start the colliery which the Thomas Coal Company has released.

This is, perhaps, the first time that a colliery fire, under the conditions that existed at the Kehley's Run, has been extinguished. The seam is fifty feet in thickness, dips at an angle of forty-five degrees, and the workings are connected with those of another colliery further to the dip. The section of the mine involved in the fire was worked out years since, was riddled with openings, and at many points had run in from the surface. The fire had six months' start on Mr. Thompson, and that he succeeded in extinguishing it, reflects the highest credit upon his skill as an engineer, and the faithfulness of his assistants. In the whole contest with the fire, Mr. Thompson made no mistakes. What he did was done so well, that confidence was from the first established among the employés, and nothing was spared to ensure success and safety. Great credit is due Messrs. Booth, Baird, and Daddow for the skill with which they executed his plans.

It was my duty to watch over the whole work to see that no unnecessary risks were taken. During the many months it occupied, my suggestions as to the safety of the employés were always courteously received and promptly acted upon, and in the whole time nothing occurred to mar the pleasant relation between myself and Mr. Thompson and the officers in charge of the work. I am also indebted to Mr. Thompson for the sketches which accompany this report. An idea of the magnitude of this undertaking may be obtained from an examination of the following figures:

There were two brands of American cement used, viz: Anchor and Rosendale. Of Anchor, seven hundred and twenty barrels, and of Rosendale, eighty barrels, also sixteen hundred barrels of imported cement—Portland—and six hundred thousand bricks.

The space inclosed in the old slope level contained fifteen million cubic feet; and the space in the new slope level, two million cubic feet.

By the time the colliery resumes shipments, nearly two years will have elapsed since the discovery of the fire, and the cost of its extinguishment was probably not less than $125,000.

THE STANTON COLLIERY MINE FIRE.

This colliery is operated by Messrs. Miller, Hoch & Co., and is located in the borough of Gilberton, Mahanoy valley. It consists of a slope, down

three lifts, making together one thousand feet, on the south dip of the Mammoth seam. The dip is very heavy, reaching sixty-five degrees in the lower lift. The third lift had just been put down, and but five breasts had been opened on each side. On the east side, breast No. 1, or that next the hoisting slope, was up about sixty-five yards, and the next, inside, not so far, when fire was discovered in breast No. 1, and it became necessary to flood the lift to extinguish it. The breast was being worked with a double shift, as it was desired to push it through all the way to the second lift, that the fire-damp, which is evolved in large quantities, might drain off before the coal was drawn. On Friday evening, December 16, the safety lamp of one of the two miners working in the place, became extinguished. One of the miners then made a careful examination of the face to ascertain if there was an accumulation of gas, and the other, whose light was extinguished, having been informed that everything was right, went down the manway a few feet, unscrewed his lamp and struck a match on the pillar to light it. The match ignited a feeder of gas from a slip, flamed through between the manway plank into the loose coal in the center of the breast and fired it. The men, thinking the flame had died out, thought no more of it and returned to their work, but in a few hours they commenced to feel the effects of gases, and an examination proved that the run was on fire. The first thing done was to lay a line of steam pipe connected with the water tanks up the outside manway, to which a hose, directed on the burning coal, was attached. There was a door on the gangway, inside of the first chute, and the whole east side current passed up this outside manway. The men could get up to the face of the burning breast and cross over to the other side, but because the smoke and gases from the burning coal were carried by the current into the inside breasts, the fire could not be approached from that side. It, thus unimpeded, made its way inside this manway and back under the top benches, where it could not be reached with the water from the hose, and was rapidly increasing. Steam and smoke were issuing from the inside manway, and I noticed the bottom slate was very dry where the water was not passing over it. Everything was being done with the hose that was possible under the conditions; but in a small manway on such a heavy pitch a man could do but little; and, again, an explosion was likely to occur at any moment, and did occur when the gas accumulated down to the fire. Under these circumstances it was determined to change the course of the air-current. A connecting hole was therefore driven from the outside manway into the return. The door on the gangway, previously mentioned, was then opened and a split was run through the next inside breast into the burning breast and down it into the return. This carried the smoke and gases generated by the fire directly to the fan, cleared the inside manway so that it could be examined, and also secured the inside breast from filling with gases from the fire. The plan of the split is shown by the arrows on the accompanying diagram. As soon as the inside manway was clear the men entered the breast and were about to

drill holes in the top to apply the hose which had been brought from the other side, when it was discovered that this whole manway below them was full of fire. It was thus beyond control and the men made their way out by the adjoining breast.

The reasons it was not attempted to load out the loose coal, and extinguish the fire with water from the hose, as it was run into the cars, were several: 1. The steam made by putting water on the burning coal would drive the men back, and prevent anything from being seen or done. In drawing the coal the manway would be broken. Through this would be lost the only means of carrying air up the breast, and the gas would accumulate until it filled down as far as the fire, and exploded. Admitting that no person would have been killed or injured, the force of the explosion would probably have driven out the battery, and run the whole breast of burning coal into the gangway. The chute and gangway might thereby have been set on fire; or, if the gangway became choked, the air would be blocked, and the gas would fill out until it reached the fire, when an explosion of great force might occur. 2. The chute and gangway timber were liable to catch fire, burn out, and close the gangway, thereby causing an accumulation of gas and an explosion. 3. In drawing out the coal, the breast might run through into the lift above. This would involve all the two upper lifts in the fire. Although worked out, the pillars and breasts contain a great deal of coal, and, also, many of the breasts run through to the surface. If the fire got fairly started in this section of the colliery, it must inevitably have ruined it. It was, therefore, after consultation, determined to hoist the mules and flood the lift. The pumps on the second lift were accordingly stopped, and the water was permitted to run into the lower lift. A steam pump was placed in a position to force water from the Mahanoy creek into a crop hole. Every available stream of water was utilized, and in a few days the water was raised to within eighty feet of the second lift, and thirty feet higher than the face of the breast on fire. When the water covered the third lift airway, as a matter of course, the breasts were sealed, and the extent to which they would fill with water depended entirely on the pressure exerted on the air and gases they contained. The air thus confined would keep back the water from the face of the breasts, and in breast No. 1 might prevent the water from reaching all the fire. It was thought advisable, therefore, before taking out the water to tap No. 1 breast with a bore hole from the second lift gangway, that the air might escape and the water rise in the breast. A hole was only gotten through with great difficulty. Several attempts to drill for the whole distance failed through the drill blocking. A small shaft was finally sunk some eighty feet, and a hole drilled through the remaining thirty feet into the breast. The drilling was done from the gangway, with rods made of wrought iron pipe, and, when the hole went through, the confined air made considerable noise in escaping, the water afterwards rising in the hole. In the breast adjoining the one which was on fire, an examination made after the water

was taken out, showed that the compressed air had kept back the water from the face seven feet. The water was then removed from the lift, the fire found to be entirely extinguished, and shipments were resumed on Monday, February 28, 1882. Some ten thousand dollars were expended in extinguishing the fire.

IMPROVEMENTS MADE AT THE COLLIERIES OF THE SHENANDOAH DISTRICT IN 1881.

Packer, No. 2, Colliery.—The Lehigh Valley Coal Company.

An engine-house, twenty-eight feet by fifty-eight feet, with a pair of Clark's two hundred horse-power direct hoisting-engines; also six boilers, thirty-two feet by thirty-six inches, and a boiler-house twenty-eight feet by sixty feet, with slate roof. For description of this hoisting-plant see report.

Packer, No. 3, Colliery.—The Lehigh Valley Coal Company.

Six boilers, thirty-two feet by thirty-six inches, and boiler-house twenty-eight feet by sixty feet.

Packer, No. 4, Colliery.—The Lehigh Valley Coal Company.

A tunnel, one hundred and nine yards, from the Mammoth to the Buck mountain seam; also one, ninety-four yards, from the upper lift of the Mammoth to the Holmes seam. A forcing fan, ten feet in diameter, driven by a forty horse-power engine, placed on an air-way to the surface, thereby ventilating the Primrose and Buck Mountain seams with a separate current. Also boiler-house, twenty-eight feet by sixty feet, with six boilers, thirty-two feet by thirty-six inches.

William Penn Colliery.—William Penn Coal Company.

A second inside hoisting slope, through the first inside slope lift, opening a second lift, one hundred yards, on the Mammoth seam, which is in fine condition. This colliery mined over two hundred and thirty thousand tons of coal in 1881, and the new lift will keep up its capacity for a long time to come. A tunnel has also been driven in the drift, south to the Buck mountain seam, which is in good condition, and will afford a lift of two hundred yards above water-level.

Kohinoor Colliery.—R. Heckscher & Co.

A new hoisting shaft, one hundred and sixty feet, to the Holmes seam, which proves to be ten feet in thickness, and in good condition. Preparations are also being made to erect hoisting, pumping, and ventilating machinery. The foundation walls for a new breaker have been commenced, making, altogether, a separate colliery of large capacity. A very large carpenter and blacksmith shop has been built to accommodate both collieries.

Oakdale Colliery.—E. L. Powell.

A new breaker has been built, which will considerably increase the capacity of the place.

Cuyler Colliery.—S. M. Heaton & Co.

A new lift, two hundred yards, has been opened on the Buck Mountain seam.

West Lehigh Colliery.—Fisher Hazard.

A tunnel, three hundred and seventy-two feet, from the Skidmore to the Mammoth seam. A new fifteen feet diameter fan, driven by a twelve horse-power engine, on the Mammoth seam, to ventilate the tunnel workings south of the Skidmore. A new plane at the breaker, to hoist lump coal and screenings for the boilers, and a new tip-house at the top of the hoisting slope.

Coal Run Colliery.—Suffolk Coal Company.

A tunnel, south from the north dip of the Primrose to a local basin, to open another section of coal on the east end of the lease. The tunnel, south from the Primrose to the Orchard seam, extended to what is supposed to be the Diamond seam. These improvements will maintain the present capacity of the colliery for a number of years.

East Bear Ridge Colliery.—Myers, McCreary & Co.

A tunnel, two hundred and thirty-six feet, has been driven into what is supposed to be the Buck Mountain seam. The coal is not in good condition, and the seam has not, as yet, been developed either east or west.

Stanton Colliery.—Miller, Hoch & Co.

A third lift of one hundred and five yards, and five hundred yards of gangway and turnout opened. In addition to the hoisting-slope, a pumping and traveling-slope was sunk to within a few feet of the third lift, where the flooding of the mine in December stopped operations. A large Allison pump has been put into the new lift. This slope is down over one thousand feet, at an angle of 60°.

Laurel Ridge Colliery.—John A. Dutter.

A tunnel from the Mammoth to the Skidmore and Buck Mountain seams. Both are in fair condition, and the improvement will enable the colliery to ship a considerable quantity of coal for several years.

Staffordshire Colliery.—Jones & Oliver.

Breaker remodeled, pockets enlarged, and boiler lengthened. The gangway has been driven through a fault, and the colliery put in condition to ship more coal in 1882 than it did in 1881.

Glendon Colliery.—J. C. Haydon & Co.

An inside slope has been sunk, and hoisting machinery erected on the Buck Mountain seam. Also, a fourteen-inch Allison pump for drainage. A twenty horse-power engine has been placed in the breaker, and three new boilers, with boiler-shed, erected.

Coplay Colliery.—L. F. Lentz.

A new slope inside of the old drift-workings on the Buck Mountain seam, connected with the shaft, where the coal is to be hoisted.

Webster Colliery.—L. S. Baldwin.

A fan, ten feet in diameter, driven by a twelve horse-power engine. This colliery depended upon natural ventilation, and the fan has greatly improved the ventilation.

Primrose Colliery.—Primrose Coal Company.

An air and traveling-way to the surface as an outlet for the new slope-workings.

Honeybrook, No. 5, Colliery, E. B. Leisenring, Lessee.

A one hundred yard slope, No. 8, on the Mammoth seam. The coal is hauled one thousand feet on the surface to the breaker. The slope is fitted with a pair of eighty horse-power engines.

The following are the improvements at the collieries of the Philadelphia and Reading Coal and Iron Company.

Connor Colliery.

A fan, twelve feet in diameter, which improves the ventilation.

West Shenandoah Colliery.

A fan, eighteen feet in diameter, to ventilate both the West Shenandoah and Turkey Run collieries, by forcing the current down an air-way at the Centennial slope, where it is split, and a part directed to each colliery. The object is, to discharge the gas and smoke of the mine locomotive used in the tunnel at Turkey Run colliery outwards, and thus prevent the vitiating of the mine atmosphere.

Ellengowan Colliery.

A hoisting slope, with single track, on the Primrose seam. Lifts have been opened out and an air-way driven, on which a fan will be placed. This slope will largely increase the capacity of the colliery.

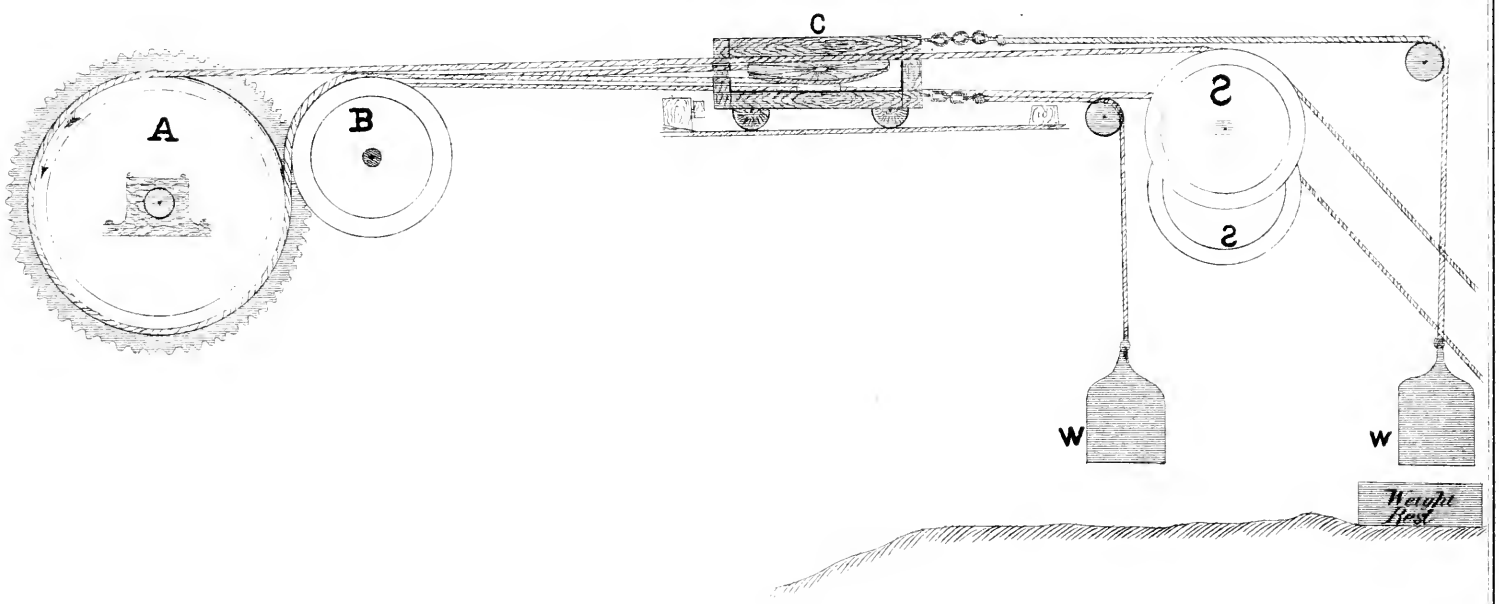
Boston Run Colliery.

A very large direct-acting pump. A hoisting engine at the head of the pump slope, to hoist and lower men and materials, thereby leaving the double-track slope exclusively for hoisting coal.

Bear Run Colliery.

A slope-house and top-landing at the head of the slope, with gravity roads to run the mine cars to and from the breaker. The empty cars being elevated at the breaker by a pitch-chain, so as to give sufficient grade to move back to the slope. These improvements replace the old structure, which was destroyed by fire.

Sketch of Hoisting Machine in operation at Lehigh Colliery



Elmwood Colliery.

A new lift has been sunk, and a short tunnel driven through the dividing slate to the top section of the Mammoth seam, to put the colliery in condition to resume operations.

North Mahanoy Colliery.

A fan, six feet in diameter, to ventilate the new water-level drift.

Schuylkill Colliery.

A new lift in the Buck Mountain seam, and single track slope, which will develop a large area of fine coal, and keep up the capacity of the colliery.

St. Nicholas Colliery.

A new air-way to the surface, and a fan that supersedes the two fans formerly used.

Hoisting Machinery.

Plan of hoisting with one rope on double track slopes as adopted by Colonel D. P. Brown, general superintendent at the Packer, No. 2 and 3, collieries of the Mahanoy division of the Lehigh Valley Coal Company.

Colonel Brown's chief object was to avoid the use of drums of such size and weight as would be necessary for ropes of the great length required.

The hoisting plant at the Packer, No. 2, colliery consists of a pair of direct acting horizontal engines, the sheaves being on the engine shaft, of the following dimensions:

Diameter of cylinders, 22 inches.

Length of stroke, 6 feet.

Diameter of hoisting sheaves, $11\frac{1}{2}$ feet.

Working pressure of steam, 60 pounds per square inch.

Length of slope, 1,400 feet.

Angle of dip, 40 degrees.

Weight of rope per foot, $3\frac{3}{10}$ pounds.

Gross weight of car, 16,000 pounds.

Time of hoisting car, about 1 minute.

The arrangement of the rope on the sheaves is explained in the accompanying diagram: A represents the hoisting sheaves, one for each track of the slope. B, contact sheaves, which hold the rope close up to increase the friction and prevent slipping on the hoisting sheaves. Both these sheaves are on one shaft, the one being keyed while the other is loose and fitted with a set-screw, tapped through its hub, to regulate any uneven tension that may be caused by the unequal weights attached to the rope, as between loaded and empty cars. A motion of one or two inches at the periphery of the sheave being almost imperceptible in the travel of the set-screw upon the shaft. C, horizontal sheave, whose diameter is equal to the distance from center to center of the tracks, mounted on a movable carriage and held in position by the weights W, W. It is set slightly from

the horizontal so that the ropes will not come in contact while running. It takes up the double or loop of the rope and keeps it in line with the hoisting sheaves. S, S, are common bearing sheaves at the top of the slope to keep the rope in position and adjust it to the angle of inclination. The direction in which the rope travels while hoisting is represented by the arrows.

The rope has a three fourth lap on each hoisting sheave.

In hoisting the rope passes from the slope over the bearing sheave S, by the horizontal sheave carriage, over and around the hoisting sheave, up and over the contact sheave, around the horizontal sheave, and back to the other hoisting sheave. It passes around that sheave and up and over the other contact sheave to the other bearing sheave and down the slope. In hoisting from one side, the end of the rope leads directly to the top of the hoisting sheave, while in hoisting from the other side the end leads to the top of the contact sheave.

The advantages claimed for this plan are:

1. Where very long ropes are required it obviates the use of large, heavy drums to hold the ropes and relieves the engines of their weights.

2. The rope is held in line with the bearing sheaves, which have no side motion, and is thus kept straight on the slope-rollers.

3. The rope does not chafe on the drum, as when the laps on smooth drums of deep shafts grind against each other as the rope coils four or six feet out of line.

4. It wears the rope uniformly from end to end, the whole length passing through the sheaves.

5. But one rope is required.

6. If, for any reason, the empty car jumps the track, at the top of the slope when starting down, the rope will slip through the sheaves in the absence of weight, and thus prevent kinking. As the indicator is attached to the contact, and not to the hoisting sheave, it is not affected by slipping.

The disadvantages that may be mentioned in connection with the plan are as follows:

1. The rope is bent in different directions, and requires to be of the best quality.

2. The whole power is transmitted through the surface of the rope.

3. When the end of the rope wears near the thimble, so as to necessitate a piece to be cut off, the horizontal sheave must be moved towards the hoisting sheaves a distance equal to half the length of the piece cut off, and, as it cannot be placed very far from the hoisting sheave at first, the number of cuts that can be made is necessarily limited.

4. When a rope breaks, the colliery is idle until a new one is obtained. Where two ropes are used, and one breaks, it can be spiked to the drum and hoisting resumed with the remaining one, with which over half of the usual quantity can be hoisted until the broken rope is replaced. With this plan, therefore, a rope should be kept in stock.

5. It is best adapted to collieries where a cage is used; or, where the car is emptied without being detached from the rope, as the weight prevents slipping on the sheaves.

6. It would be unsafe to use a spliced rope because of the bending over and around the sheaves.

The space between the hoisting sheaves is lagged even with their peripheries and made similar to a drum, so that should the rope accidentally get out of the groove of the hoisting sheaves it will be held up by the lagging. The steam brake wheel is placed between the hoisting sheaves and is quick and powerful. There is also a steam ram to assist the engineer to reverse the link motion.

One of the two weights holding the movable carriage has a rest under it so that in the event of sudden slack it catches, while the other, which is attached to the lower side of the carriage, give sufficient tension for hoisting.

Two indicators are required, as the engineer can not see which end of the rope is up by looking at the sheaves. One is necessary to show the position of the car in the slope, and the other to show which end is up.

It works very satisfactorily and the ropes wear well for the quantity of coal hoisted and the high speed.

The rope now in use at Packer, No. 3, colliery has been on for fifteen months, in which time it has hoisted, with a car weighing fourteen thousand pounds gross, over two hundred thousand tons of coal a distance of eleven hundred and forty feet, (vertically five hundred and eighty feet,) and still appears in good condition.

DATE.	Names.	Occupation.	Name of the Collieries.	Age.	Married or Single.	Number of children.	Remarks.
Jan. 4	Michael Hennegan,	Miner,	Kohinoor,	27	Single,		Killed; struck by coal.
12	James Curran,	Miner,	Glendon,				Killed; fall of slate.
Feb. 18	Thomas Moren,	Miner,	West Shenandoah,	35	Married,	4	Killed; fall of coal.
Mar. 14	Patrick McGloughlin,	Miner,	St. Nicholas,	42	Married,	4	Suffocated by gas.
15	William Couch,	Miner,	William Penn,	20	Single,		Killed; fall of coal.
21	Evan Davis,	Miner,	Primrose,	60	Married,	7	Fatally injured; fall of coal.
April 7	Mathew Burns,	Laborer,	Cuyler,	20	Single,		Fatally injured; scalded.
20	Patrick Lacey,	Miner,	West Shenandoah,	50	Married,	9	Fatally injured; struck by a piece of coal; died on the 20th.
25	Thomas Delaney,	Laborer,	Cuyler,	19	Single,		Killed; jammed between wagons.
May 6	Robert Edwards,	Oiler,	Conner,	15			Killed; riding on loaded mine wagons; struck on head by bridge.
July 4	Thomas Rourke,	Ash carter,	Boston Run,	30	Married,	2	Killed; explosion of boiler.
15	Philip Crosser,	Bottom man,	Honey Brook, No. 4,	30	Single,		Fatally injured; crushed between cars at bottom of slope.
16	Philip Smith,	Miner,	Plank Ridge,	48	Married,	8	Killed; fall of slate.
29	Joseph Vallance,	Miner,	North Mahanoy,	50	Married,		Killed; fall of coal.
Aug. 16	Joseph Davidson,	Fire boss,	Ellangowen,	25	Married,	1	Killed; fall of top coal.
Sept. 2	Frank Humes,	Miner,	Girard,	30	Married,	1	Suffocated by gas.
7	John Rupert,	Driver,	Cuyler,	18	Single,		Killed; run over by empty wagons.
28	Patrick Rawley,	Miner,	Packer, No. 3,	25	Single,		Killed; drill run through his body.
Oct. 11	Peter Ward,	Miner,	Indian Ridge,	60	Widower,		Killed; a piece of coal rolled on him.
11	Michael Martin,	Laborer,	Packer, No. 3,	60	Married,		Fatally injured by mine cars.
14	Mark Willis,	Miner,	Honey Brook, No. 4,	26	Married,	4	Fatally injured; fall of coal.
18	Philip Ryan,	Miner,	Kohinoor,	26	Single,		Killed by shot.
19	George Bardanier,	Slate picker,	Draper,	13			Killed; caught in screen.
20	John Craig,	Laborer,	Shenandoah City,	30	Widower,	3	Fatally injured; explosion of gas.
21	John Ward,	Miner,	Mahanoy City,		Married,		Killed; fall of coal.
21	Miles Kellar,	Laborer,	Mahanoy City,		Married,		Fatally injured; fall of coal.
24	William B. Thomas,	Miner,	William Penn,	35	Married,	1	Killed; fall of coal.
Nov. 3	Thomas Yarnell,	Driver,	Ellangowen,	15			Killed; run over by dumper.
25	Martin Dwyer,	Miner,	Glendon,	40	Married,	9	Killed; fall of coal.
26	John Madden,	Miner,	Ellangowen,	60	Married,	3	Killed by blast.
29	Richard C. Northey,	Miner,	Coal Run,	35	Married,	3	Fatally injured; run over by empty mine cars.
Dec. 17	David Parry,	Driver,	Kohinoor,	17			Fatally injured; jammed between cars.
26	John Oliver,	Miner,	Turkey Run,	35	Married,	1	Fatally injured; struck by coal.
30	Patrick Cosgrove,	Coupler,	William Penn,	17			Killed; run over by cars.

REGISTER OF NON-FATAL CASUALTIES.

DATE.	Names.	Occupation.	Name of the Collieries.	Remarks.
Jan. 4	Theodore Haler,	Miner,	Kohinoor,	Fall of coal; head cut severely.
4	Samuel Smith,	Laborer,	Schuylkill,	Hand cut by piece of coal.
13	Joseph Stoffer,	Laborer,	Tunnel Ridge,	Leg broke by timber falling on it.
17	William Mulhall,	Coupler,	West Shenandoah,	Leg crushed between cars.
17	George Hunsacker,	Laborer,	Bear Run,	Finger mashed by cars.
18	Robert Harley, junior,	Miner,	Plank Ridge,	Body severely injured; caught between mule and car.
19	Martin Corigan,	Miner,	Ellangowen,	Fall of slate; foot injured.
23	Patrick Bradley,	Miner,	Audenried, No. 1,	Fall of coal; leg broke.
Feb. 5	Abraham Moslow,	Loader,	Bear Ridge, No. 2,	Leg broke while loading wagon.
5	Charles Thornberger,	Miner,	Plank Ridge,	Finger mashed; caught between cage and gate.
7	Lewellyn Beddow,	Fire-boss,	North Mahanoy,	Shoulder displaced; fell while crossing chute.
8	James Hunt,	Dumper,	Indian Ridge,	Part of thumb cut off; run over by dumper.
8	Adam Kantner,	Miner,	Lehigh, No. 3,	Leg broke; fall of coal.
14	Thomas Lewis,	Roadman,	Audenried, No. 1,	Body injured; struck by piece of coal.
17	Fred. Grumm,	Driver,	Girard,	Finger mashed; caught by wagon.
25	George Taylor,	Miner,	Kohinoor,	Body injured; fall of coal.
26	Nathan Crundel,	Loader,	West Shenandoah,	Head cut, and skull fractured; fell off cars.
26	T. F. Goyne,	Loader,	Glendon,	Ankle dislocated, and leg broke; fell down dirt chute in breaker.
Mar. 2	Dennis Joyce,	Laborer,	William Penn,	Arm broke; caught in screen in breaker.
8	Patrick Keenan,	Driver,	West Shenandoah,	Shoulder bone broke; caught between two wagons.
10	Joseph Letham,	Driver,	Indian Ridge,	Leg broke; lever fell on him.
16	Thomas Fishburn,	Miner,	Knickerbocker,	Back injured; fall of coal.
29	William Davis,	Miner,	West Lehigh,	Leg broke; struck by coal while going up breast.
April 11	Abraham McCord,	Driver,	Plank Ridge,	Body injured; caught betwen wagons.
13	George Parker,	Miner,	Plank Ridge,	Leg broke; caught between wagons.
13	Joseph Casper,	Loader,	Knickerbocker,	Leg injured; caught between chute and car.
13	Richard Palmer,	Inside boss,	William Penn,	Explosion of gas.
27	George Rephorn,	Driver,	Ellangowen,	Arm fractured; caught by sprag on car.
28	George Richards,	Door-boy,	Conner,	Thumb mashed; caught between bumpers of two cars.
May 3	James Cosgrove,	Miner,	Packer, No. 3,	Thigh broken; fall of top coal.
4	James Cook,	Driver,	Indian Ridge,	Finger broke; caught between hitching plate and speader hook.
4	Joseph Short,	Miner,	Ellangowen,	Foot mashed; fall of coal.
6	August Strunk,	Miner,	Kohinoor,	Ankle broke; fall of coal.
7	Edward Flaherty,	Miner,	Plank Ridge,	Foot hurt; fall of coal.
7	Benjamin Hayden,	Laborer,	Tunnel Ridge,	Collar bone broke; jammed between cars.
7	James Lord,	Laborer,	Boston Run,	Leg injured; fall of coal.
9	Patrick Breman,	Miner,	Glendon,	Badly cut by premature blast.
9	John Allen,	Miner,	Turkey Run,	Shoulder hurt; fall of coal.
9	Patrick Giblin,	Miner,	Ellangowen,	Head, arm, and foot injured; fall of coal.
13	James Kane,	Laborer,	Boston Run,	Leg broke; fall of clay and rock on surface.
16	John Monaghan,	Miner,	Conner,	Knee-cap broke; struck by a piece of coal.
19	George Link,	Miner,	Glendon,	Slightly hurt; fall of rock in slope.
19	Edward Dwyer,	Miner,	Glendon,	Ankle spralned; fall of rock in slope,
25	Patrick Coyne,	Miner,	Ellangowen,	Cut on hip; premature blast.
28	Patrick Fannery,	Starter,	Stanton,	Slightly burned; explosion of gas.
28	Thomas Haynes,	Loader,	Stanton,	Slightly burned; explosion of gas.

REGISTER OF NON-FATAL CASUALTIES—*Continued.*

DATE.	Names.	Occupation.	Name of the Collieries.	Remarks.
May 28	Samuel Burchell,	Loader,	Stanton,	Slightly burned; explosion of gas.
28	George Pierce,	Driver,	Stanton,	Slightly burned; explosion of gas.
30	John Dowling,	Miner,	Plank Ridge,	Back and leg bruised; fall of coal.
June 7	Michael Wade,	Miner,	Packer, No. 3,	Cut on head; premature blast.
7	Jeremiah Conners,	P. man,	Indian Ridge,	Thumb cut off by machinery.
15	Henry Holden,	Driver,	Indian Ridge,	Arm broke by mine car.
17	James Brennan,	Laborer,	Schuylkill,	Elbow dislocated; fell while loading rock car.
17	Anthony Rumpt,	Laborer,	Ellangowan,	Back and breast injured; squeezed between platform and car.
22	Thomas Keating,	Laborer,	Knickerbocker,	Shoulder dislocated while unloading lumber.
27	John Swartz,	Miner,	North Mahanoy,	Knee dislocated; struck by piece of coal from shot.
27	Jacob Kline,	Loader,	William Penn,	Leg broke; fall of coal.
28	Joseph Whalen,	Miner,	Boston Run,	Back and leg broke; fall of coal.
July 7	David Miller,	Loader,	West Lehigh,	Crushed while starting a battery.
11	Richard Dobb,	Loader,	Ellangowan,	Hip dislocated while coupling wagon.
11	William Wireman,	Loader,	Mahanoy City,	Both legs broken; fall of coal.
14	John Miles,	Slate-picker,	West Lehigh,	Leg broke by mine car.
15	Thomas McDonald,	Miner,	Packer, No. 4,	Head and hands burned; explosion of gas.
16	Bernard Murray,	Starter,	Hammond,	Foot crushed; fall of rock.
19	Anthony Lutatonis,	Loader,	Packer, No. 3,	Body severely crushed by mine car.
20	Thomas Leachy,	Starter,	Tunnel Ridge,	Toe crushed by mine car.
23	William McGee,	Dirt bank driver,	Ellangowen,	Hand and foot injured; run over by loaded dumper.
25	Patrick Graham,	Slate-picker,	Ellangowen,	Head and breast injured; fell from landing into dirt track of breaker.
25	John Cafferty,	State-picker,	Conner,	Head and body injured.
Aug. 1	Joseph Lockhart,	Miner,	Schuylkill,	Toe cut off; fall of coal.
1	Jacob Slemmer,	Loader,	Ellangowen,	Leg hurt; fell under wheels of car.
2	Adam Frerris,	Miner,	Plank Ridge,	Leg injured; fall of slate.
2	David Evans,	Miner,	West Lehigh,	Foot injured; fall of coal.
4	Bryan McGuire,	Miner,	William Penn,	Side injured; fall of coal.
4	John Engle,	Loader,	North Mahanoy,	Hand bruised; caught between wagon and lump of coal.
5	H. W. Jones,	Miner,	Packer, No. 4,	Head and back injured; fall of coal.
6	George Ridley,	Miner,	Packer, No. 3,	Breast and shoulders injured; fall of coal.
6	Thomas Colahan,	Driver,	Conner,	Leg injured; fell under car.
6	John Ford,	Miner,	Mahanoy City,	Back injured; fall of coal.
8	Patrick McDonald,	Starter,	Hammond,	Knee bruised; fell into chute.
8	John Emanuel,	Miner,	Kohinoor,	Slightly burned; explosion of gas.
8	David Blacker,	Miner,	Kohinoor,	Slightly burned; explosion of gas.
8	Adam Scavadge,	Laborer,	Kohinoor,	Slightly burned; explosion of gas.
10	John Murphy,	Miner,	Hammond,	Back and eyes injured; fall of coal.
11	Thomas Tollet,	Miner,	Girard,	Finger broke while lifting a collar.
12	Patrick McJurney,	Miner,	Schuylkill,	Finger mashed; caught between guides and water-tank.
16	Patrick Flarcherty,	T. man,	West Shenandoah,	Foot injured by cars.
20	John Rice,	Laborer,	Mahanoy City,	Hand mashed; door of wagon fell on it.
20	Samuel Adams,	Miner,	Suffolk,	Leg injured; fall of coal.
22	Jacob Bowenberger,	Locomotive conductor	Turkey Run,	Foot mashed; caught between locomotive bumper and wagon.
22	Michael Welsh,	Miner,	Shenandoah City,	Hands and face slightly burned; explosion of gas.
23	John Bennett,	Miner,	St. Nicholas,	Shoulder dislocated, in jumping from air-way to gangway,

	23	Michael Burke,	Miner,	Ellangowen,	Leg broke; fall of coal.
	25	Sampson Molton,	Miner,	Turkey Run,	Finger cut off while making wedge for pick-handle.
	27	Malachi Sweeney,	Miner,	Shenandoah,	Back hurt; fall of coal.
	30	Michael Durkin,	T. man,	Packer, No. 3,	Body injured; fell while trying to board wagon.
Sept.	3	James Mitchell,	Miner,	Boston,	Back injured; fall of coal.
	5	Patrick Monahan,	Miner,	Conner,	Back injured; fall of coal.
	6	William Hennessee,	Loader,	Ellangowen,	Head and shoulders injured; caught between wagons.
	10	Thomas Lee,	Door-boy,	Kohinoor,	Body injured; fell under empty wagon.
	17	George Keonig,	Laborer,	Indian Ridge,	Collar-bone broke; struck by mine cars.
	21	Martin Foley,	Driver,	Ellangowen,	Finger mashed; caught between prop and mine car.
	22	Nell Davenport,	Miner,	West Shenandoah,	Leg hurt; fall of coal.
	22	Reese Daniels,	Miner,	West Lehigh,	Face and hands burned; explosion of gas.
	22	Abraham Jenkins,	Miner,	West Lehigh,	Face and hands burned; explosion of gas.
	27	John Hullihan,	Door-boy,	Draper,	Head injured; door of wagon fell on him.
Oct.	1	William Dovey,	R. man,	Turkey Run,	Foot injured; fall of slate.
	7	John Cavanna,	Miner,	Gilberton,	Hand injured by shot.
	7	Samuel Nox,	Fire boss,	Glendon,	Body injured; run over by mine cars.
	8	John Holland,	Miner,	Kohinoor,	Leg injured; fall of coal.
	11	Isaac Jones,	Engineer,	Indian Ridge,	Thumb cut off by machinery.
	11	Hiram Humphreys,	Miner,	Tunnel Ridge,	Face and arms injured by shot.
	11	Thomas Moran,	Miner,	William Penn,	Fall of coal; toe badly cut.
	13	Thomas Dorst,	Laborer,	Hammond,	Toe crushed; lever fell on his foot.
	18	Frank Longuskie,	Miner,	Kohinoor,	Leg broke; fall of coal.
	19	Thomas Miner,	Blacksmith,	Turkey Run,	Back injured; struck by fly-wheel.
	20	Thomas McAtee,	Miner,	Shenandoah,	Hands and face burned; explosion of gas.
	20	James Regan,	Laborer,	Shenandoah,	Hands and face burned; explosion of gas.
	20	Samuel Roberts,	Miner,	Shenandoah,	Hands and face burned; explosion of gas.
	21	Josiah Millard,	Miner,	Tunnel Ridge,	Head and chest injured; fall of coal.
	21	Samuel Ramsdale,	Miner,	Girard,	Back injured; fall of coal.
	21	Thomas Ward,	Miner,	Mahanoy City,	Internally injured; fall of coal.
	21	Timothy Whittle,	Laborer,	Mahanoy City,	Slightly injured; fall of coal.
	24	Henry Thomas,	Miner,	William Penn,	Ankle dislocated; fall of coal.
Nov.	2	John Hines,	Slate-picker,	Indian Ridge,	Foot injured; run over by cars.
	2	William Tollan,	Loader,	Indian Ridge,	Thigh broke; fall of coal.
	9	Robert Boriton,	Miner,	Draper,	Foot and ankle injured; fall of coal.
	12	Thomas Gennings,	Laborer,	Indian Ridge,	Badly injured by mine cars.
	12	Thomas Wood,	Miner,	Ellangowen,	Back injured; fall of coal.
	14	Patrick Fey,	Laborer,	Coal Run,	Back injured; fall of coal.
	18	William Brennan,	Miner,	Knickerbocker,	Leg broke; fall of coal.
	25	Christ Oswalt,	Slate-picker,	Hammond,	Arm broke while fooling with another boy.
	25	Daniel Barret,	Miner,	Hammond,	Back injured; fall of coal.
	25	Evan Davis,	Door-boy,	Girard,	Arm broke; fell under wagon.
Dec.	1	John Bowen,	Laborer,	Bear Run,	Face and arms injured; premature blast.
	5	John Martin,	R. B. man,	North Mahanoy,	Leg bruised; caught between bumpers of cars.
	10	John Stephen,	Laborer,	Schuylkill,	Eye injured; fall of coal.
	10	Michael Tillard,	Miner,	Indian Ridge,	Head injured; fall of coal.
	12	John Gallagher,	Door-boy,	Parker, No. 3,	Arm broke by empty cars.
	14	Thomas L. Williams,	Miner,	Audenried, No. 4,	Back injured; fall of coal.
	14	Edward Price,	Miner,	Conner,	Foot injured; fall of coal.
	17	Martin Burns,	P. man,	West Shenandoah,	Foot crushed while unloading timber.
	20	William Pratt,	D. loader,	Knickerbocker,	Leg and body bruised; caught between two cars.
	21	Adam Kuntzler,	Laborer,	North Mahanoy,	Back and breast injured; fall of coal.

REGISTER OF NON-FATAL CASUALTIES—*Continued.*

DATE.	Names.	Occupation.	Names of the Collieries.	Remarks.
Dec. 22	Thomas Joyce, ...	Miner, ...	Schuylkill, ...	Hip injured; fall of coal.
24	Charles Flail, ...	Miner, ...	Tunnel Ridge, ...	Hip injured; fall of coal.
27	Joseph Grady, ...	Driver, ...	Indian Ridge, ...	Leg injured; run over by dumper.
29	Charles Thompson, . . .	Loader, ...	Turkey Run, ...	Hip injured; caught between cars and door frame.
29	William Simmons. . . .	Miner, ...	Indian Ridge, ...	Leg hurt; fall of coal.

RECAPITULATION OF FATAL ACCIDENTS,

Explosions of gas,	1
Explosions of powder and blasts,	2
Explosions of boilers,	1
Suffocated by gas,	2
Falls of coal, slate, &c.,	16
Mine cars and machinery,	10
Miscellaneous,	2
Total,	34

RECAPITULATION OF NON-FATAL ACCIDENTS.

Explosions of gas,	15
Explosions of powder and blasts,	6
Falls of coal, slate, &c.,	68
Mise cars and machinery,	47
Miscellaneous,	13
Total,	149

NUMBER OF EMPLOYEES, COAL MINED, DAYS WORKED, &c., FOR YEAR ENDING DECEMBER 31, 1881.

COLLIERIES.	OPERATORS.	NUMBER EMPOYEES.			Number kegs of powder used.	Number days worked.	Number of horses and mules.	Number of persons killed.	Number of persons injured.	Number of tons coal shipped.
		Inside.	Outside.	Total.						
Conner,	Philadelphia and Reading Coal and Iron Company,	166	118	284	3,450	241½	37	1	6	137,251.01
Hammond,	do. do.	115	120	235	3,810	235¼	24	. . . .	6	95,274.09
Girard,	do. do.	96	130	226	625	211½	32	1	4	69,567.07
Girard Mammoth,	do. do.	77	66	143	600	88¾	23	. . . .	. . . .	14,273.08
Indian Ridge,	do. do.	263	213	476	3,765	244½	46	1	12	143,562 07
Plank Ridge,	do. do.	201	118	319	4,650	241½	29	1	7	107,195.09
Shenandoah City,	do. do.	144	96	240	1,825	239⅛	34	1	5	84,819.11
Kinckerbocker,	do. do.	127	114	241	1,985	242½	23	. . . .	5	113,555.01
Ellangowen,	do. do.	344	243	587	5,650	235¾	46	3	14	240,977.05
West Shenandoah,	do. do.	140	173	313	2,810	243¼	22	2	6	123,264.09
Turkey Run,	do. do.	204	126	330	2,850	240½	29	1	6	114,298.16
Gilberton,	do. do.	108	93	201	1,800	175⅔	20	. . . .	1	52,988.14
Bear Run,	do. do.	98	104	202	500	109⅔	19	. . . .	2	19,221.10
St. Nicholas,	do. do.	111	93	204	2,455	237⅙	27	1	1	111,031.10
Boston Run,	do. do.	53	80	133	1,100	197⅔	18	1	4	46,705.17
Elmwood,	do. do.	15	25	40	85	4⅓	2	. . . .	. . . .	282.05
Tunnel Ridge,	do. do.	123	114	237	2,470	237	18	. . . .	6	74,654.15
Mahanoy City,	do. do.	164	131	295	2,825	241¼	39	2	5	114,339.13
North Mahanoy,	do. do.	167	68	235	2,015	225½	22	1	5	71,190.11
Schuylkill,	do. do.	122	93	215	2,650	240¼	13	. . . .	6	81,925.02
Packer, No. 1,	Lehigh Valley Coal Company,	105	140	245	1,239	188	24	. . . .	. . . .	81,564.00
Packer, No. 2,	do. do.	182	165	347	2,239	244⅔	22	. . . .	. . . .	126,510.19
Packer, No. 3,	do. do.	210	149	359	3,199	245½	12	2	7	170,078.11
Packer, No. 4,	do. do.	257	128	385	5,481	242⅔	16	. . . .	2	200,682.07
William Run,	William Penn Coal Company,	150	280	430	5,000	260	47	3	6	222,252.09
Kohinoor,	Richard Heckshey,	276	173	449	3,000	203	39	3	9	175,861.00
Cambridge,	Cambridge Coal Company,	14	6	20	120	211½	3	. . . .	. . . .	9,065.12
Oak Dale,	E. L. Powel,	17	11	28	500	222	2	. . . .	. . . .	10,000.00
Cuyler,	S. M. Heaton & Co.,	225	143	368	5,678	260	38	3	. . . .	177,954.04
West Lehigh,	Fisher, Hazzard & Co.,	102	94	196	1,006	165	22	. . . .	6	46,737.16
Coal Run,	Suffolk Coal Company,	191	110	301	3,064	245½	21	1	2	127,400.04
East Bear Ridge,	Myers, McCreary & Co.,	99	142	241	1,090	237	14	. . . .	1	74,425.09
West Bear Ridge,	do. do.	122	142	264	654	224½	19	. . . .	. . . .	63,196.17
Stanton,	Miller, Hock & Co.,	129	126	255	873	208	24	. . . .	4	57,834.05
Draper,	John Milnes & Co.,	143	125	268	3,058	248	23	1	2	117,132.09

Laurel Ridge,	John A. Dutter,	17	22	39	229	157	3	. . . .	1	11,016.00
Lawrence,	Lawrence, Merkle & Co.,	131	113	244	600	237	23	. . . .	. . .	112,200.00
Staffordshire,	Jones & Oliver,	10	6	16	140	231½	4	. . . .	. . .	11,422.01
Glendon,	J. C. Haydon & Co.,	142	95	237	1,912	207	28	2	5	96,481.00
Coplay,	L. F. Lentz,	22	82	104	1,330	235¾	34	. . . .	. . . .	68,777.12
North Star,	Reynolds, Roberts & Co.,	36	18	54	500	180	6	. . . .	. . . .	24,000.00
Webster,	L. S. Balwin,	27	28	55	770	242¼	6	. . . .	. . . .	24,119.11
Primrose,	Primrose Coal Company,	80	50	130	1,890	225	12	1	. . . .	55,193.02
Honey Brook, No. 1,	E. B. Leisenring,	95	95	190	1,630	208	22	. . . .	2	81,116.01
Heney Brook, No. 4,	do. do.	170	106	276	2,705	225	26	2	1	164,940.07
Honey Brook, No. 5,	do. do.	127	127	254	1,464	220⅛	28	. . . .	. . . .	124,302.12
		5,917	4,994	10,911	97,391	* 215¼	841	34	149	4,249,643.08
Consumed and sold at colliery,		. . .	. . . .	. . . .	. . . .	. . . .	. . .	. . . .	. . .	254,980.18
Total tons produced,		. . . .	. . .	. . . .	. . . .	. . .	. . . .	. . . .	. . .	4,504,624.06

* Average.

Comparative Statement of Casualties, Tonnage, and Employees, for seven years, in Second or Shenandoah Division of Mining District of Schuylkill.

YEARS.	Killed.	Injured.	Total.	Total number of employés.	Number of employés to each casualty.	Total number of tons of coal mined.	Number of tons of coal mined to each fatal casualty.	Number of tons of coal mined to each non-fatal casualty.	Ratio of tons of coal mined to casualties.	Number of tons mined to each employé.
1875,	26	114	140	10,403	$74\frac{43}{140}$	2,562,345	98,556	22,476.14	18,302.09	247.09
1876,	27	48	75	10,218	$136\frac{18}{75}$	2,891,117	107,078	60,210.15	38,548.04	282.11
1877,	33	54	87	10,537	$121\frac{10}{87}$	3,805,467	115,317	70,471.12	43,741	361.03
1878,	26	89	115	10,255	$89\frac{20}{115}$	3,049,275	117,279.16	34,261.10	26,515.08	297.06
1879,	43	111	154	11,080	72	4,386,966	102,022.10	39,522.05	28,486.16	395.18
1880,	39	92	131	11,471	$87\frac{48}{100}$	3,753,785.14	96,250.18	40,802	28,654.17	327.04
1881,	34	149	183	10,911	$59\frac{114}{183}$	4,504,624.06	132,488.01	30,232.02	24,615.02	412.01
Total,	228	657	885	. . . . .	. . . . .	24,953,583.01				
Average,	$32\frac{4}{7}$	$93\frac{6}{7}$	$126\frac{3}{7}$	$10,696\frac{3}{7}$	$91\frac{4}{5}$	3,564,797.11	109,855.05	42,568	29,837.11	331.16

NAMES OF COLLIERIES in operation, and Coal mined in Shenandoah Division of Schuylkill District, during the years 1880-81.

NAMES OF THE COLLIERIES.	Location of Collieries.	Names of Operators.	1880.	1881.
Boston Run,	Boston Run,	Philadelphia and Reading Coal and Iron Company,	67,956.03	46 705 17
Conner,	Girardsville,	do. do.	107,995.09	137,254.01
Ellangowen,	Lanigans,	do. do.	187,261.18	240,977.05
Elmwood,	Mahanoy City,	do. do.	7,690 06	282.05
Girard,	Girardsville,	do. do.	81,894.13	69 567.07
Hammond,	do.	do. do.	70,649.19	95,274.09
Indian Ridge,	Shenandoah,	do. do.	118,338.11	143,562.07
Knickerbocker,	Yatesville,	do. do.	100 223 05	113 555.01
Mahanoy City,	Mahanoy City,	do. do.	98,613.17	114,339.13
Mahanoy, North,	do.	do. do.	89,752	71,190.11
Plank Ridge,	Shenandoah,	do. do.	91,740.13	107,195.09
Schuylkill,	Mahanoy City,	do. do.	9 266.06	81,925.02
West Shenandoah,	Shenandoah,	do. do.	111,042.11	122,264 09
Shenandoah City,	do.	do. do.	52,689	84,819.11
Bear Run,	St. Nicholas,	do. do.	30,277.16	19,221.10
Furnace,	Gilberton,	do. do.	35,336.07	
Gilberton,	do.	do. do.	13,229.18	52,988.14
Girard Mammoth,	Raven Run,	do. do.	722.14	14,273.08
St. Nicholas,	St. Nicholas,	do. do.	69,931.09	111,031 10
Turkey Run,	Shenandoah,	do. do.	88,289.10	114,298.16
Tunnel Ridge,	Mahanoy City,	do. do.	3 458.17	74,654.15
Bear Ridge, No. 1,	Mahanoy Plane,	Myers, McCreary & Co.,	64,004 19	63,196.17
Bear Ridge, No. 2,	do.	do. do.	64 549 03	74,425.09
Colorado, No. 1,	West Mahanoy township,	Lehigh Valley Coal Company,	71,530.14	81.564
Shenandoah, No. 2,	do.	do. do.	126,224.15	126,510.19
Lehigh, No. 3,	do.	do. do.	79.661 18	170,078 11
Packer, No. 4,	do.	do. do.	178,713 07	200,682 07
Cambridge,	Shenandoah,	Cambridge Coal Company,	5 122	9 065.12
Cuyler,	Raven Run,	Heaton Brothers,	147,152	177,954 04
Copley,	Mahanoy City,	Lentz & Bowman,	57,026.14	68 777.12
Draper,	Gilberton,	Philadelphia and Reading Coal and Iron Company,	87,982.15	117 132.09
Glendon,	Mahanoy City,	J. C. Haydon & Co.,	89,566 19	95,481
Honeybrook, No. 1,	Andenreid,	Lehigh and Wilkes-Barre,	80,778 10	81 116.01
Honeybrook, No. 4,	do.	do. do.	110,712 04	164 940 07
Honeybrook, No. 5,	do.	do. do.	124 153.02	124,302.12
Kohinoor,	Shenandoah,	R. Heecksher & Co.,	159,813 14	175 861
Lawrence,	Gilberton,	Lawrence, Merkle & Co.,	95,381.10	112,200
Primrose,	Mahanoy City,	Primrose Coal Company,	41.786.06	55,193 02
Stanton,	Gilberton,	Miller, Hock & Co.,	62,803.10	57,854.05
Coal Run,	St. Nicholas,	Suffolk Coal Company,	93 292 03	127 400.04
Staffordshire,	do.	Jones & Oliver,	8,111 19	11,422.01
Kehley Run,	Shenandoah,	Thomas Coal Company,	80.832 02	
William Penn,	West Mahanoy township,	William Penn Coal Company,	174 000	222 252 09

NAMES OF COLLIERIES in operation, &c.—*Continued.*

NAMES OF THE COLLIERIES.	Location of Collieries.	Names of Operators.	1880.	1881.
West Lehigh,	Mahanoy City,	Fisher, Hazzard & Co.,	40,269.19	46,757.16
Webster,	..	L. S. Baldwin,	15 167.04	24.119.11
Oakdale,	..	E. L. Powel,	3 896	10,000
Mammoth,	Mahanoy City,	..	156	
North Star,	do.	Reynolds & Roberts,	15 413 15	24,000
Laurel Ridge,	..	John A. Dutter,	19 583	11,016
Hill Side,	..	..	3,000	
Eureka,	..	..	6,576	
Total shipped to market,			3,543 663.04	4,249,643.08
Consumed or sold at colliery,			210,122.10	254,980.18
Gross total produced,			3,753,785.14	4,504,624.06

THIRD OR SHAMOKIN DISTRICT.

Office of the Inspector of Mines, Shamokin District,
Ashland, *March 27, 1882.*

To His Excellency Henry M. Hoyt,
Governor of Pennsylvania:

Dear Sir: In compliance with an act of Assembly, entitled "An act providing for the health and safety of persons employed in and about coal mines," approved March 3, 1870, I herewith have the honor of submitting this, my annual report of the proceedings, accidents, fatal and non-fatal, condition of workings, with tabulated statements of employés, tonnage, &c., for the year 1881:

Total quantity of coal shipped to marked,	4,181,696.17
Consumed or sold at colliery,	250,904.16
Total production for year 1881,	4,432,601.13
Total production for year 1880,	3,461,371.18
Increase over that of the year 1880,	971,229.15
Number of employés inside,	6,990
Number of employés outside,	4,885
Total number of employés,	11,875
Number of kegs of powder used,	84,578
Average number of days worked,	$217\frac{11}{16}$
Number of fatal casualties,	48
Number of non-fatal casualties,	147
Total number of casualties,	195
Ratio of fatal accidents to total number of employés,	$247\frac{3}{16}$
Ratio of non-fatal accidents to total number of employés,	$80\frac{7}{10}$
Ratio of fatal accidents to tons of coal produced,	92,346
Ratio of casualties to tons of coal produced,	22,731
Ratio of non-fatal casualties to tons of coal produced,	30,154

Two hundred and twenty-nine visits were made to collieries to examine their workings. Attended thirty-one inquests. Traveled, in performance of those duties, by rail, five thousand nine hundred and forty-seven miles; in the mines, six hundred and fifty-seven miles; on foot, outside, seven hundred and forty miles; total, seven thousand three hundred and forty-four miles.

In addition to tabulated statements of number of employés in and about the mines, number of tons of coal produced, number of kegs of powder used, and days worked during the year, I have given my views on ventilation, the benefits to be derived therefrom, accidents, their nature and causes, together with suggestions as to how many of them might have been avoided, and such other information as I deemed of importance to those engaged in the mining and production of coal.

Respectfully, your obedient servant,

JAMES RYAN,
Inspector.

GENERAL IMPROVEMENTS.

Short Mountain Colliery.

Sunk Lykens Valley slope down to level of short Mountain slope; put in place four new boilers at Lykens Valley slope-house; added a set of elevators, bins, &c., to breaker; drove thirty-three and two thirds yards of rock tunnel from Short Mountain slope level gangway to White vein, not yet completed; made two new planes in lower level, west gangway.

Enterprise.

Built one carpenter shop; placed in position two boilers thirty-four by twenty-eight feet long, with walls, &c., complete; and an addition to boiler-house for same.

Greenback.

Drove a tunnel from Mammoth to Skidmore vein, a distance of one hundred and four feet.

Peerless.

Have sunk a second lift on the north dip slope; completed airway and pumpway, and started to drive both gangway.

Buck Ridge.

Have sunk the slope on No. 9 vein down a lift of one hundred yards, sinking on No. 8, vein.

Cameron.

Sunk an inside slope one hundred and twenty yards deep from level of No. 9 slope, west gangway.

Luke Fidler.

A new slope of one hundred and twenty-five yards has been commenced; also a rock airway for the better ventilation of colliery.

Pennsylvania.

Nine blocks of new houses and an addition to breaker have been built. A new inside slope of one hundred yards is being sunk from present three hundred yard slope, east gangway level, which is nearly finished.

Hickory Ridge.

Sinking a new slope. When completed will be two hundred yards down; now about twenty yards.

Mount Carmel.

Put in two new steam pumps, No. 1, diameter twelve inches, length of stroke six feet, No. 2, ten inches in diameter, length of stroke fourteen inches.

Montana, No. 2.

Drove a tunnel one hundred and fifteen feet from south dip across east end of basin to north dip.

Big Mountain.

Sunk a double track slope one hundred and forty-three yards on No. 8, Twin vein on an angle of fifty degrees. Put up two hoisting engines, sixty horse power each. One fan engine, forty horse power. Put in place six boilers, thirty-six by thirty inches in diameter; drove three tunnels, viz: one down slope, twenty-one and two thirds yards, one in Mahonoy drift No. 1, eighty-three and one third yards, and one in Mahonoy drift No. 4, eleven yards long.

Monitor.

Sunk a double track inside slope sixty yards, on an angle of fifty-five degrees. Put up a sixty horse power engine to hoist coal therefrom, together with putting in place four new boilers, thirty feet long by thirty-six inches in diameter.

Fatal Accidents by Falls of Coal Roof, &c.

Accident No. 1.—Joseph Kranbetz, miner, age thirty-one years, was fatally injured at North Frankin colliery, No. 2, on January 17, by a fall of top slate. Died on the 19th.

He was working with a man named John Lindaur. About two hours previous to the accident, deceased sounded the slate, and after unsuccessful efforts to bar it down, concluded there was no danger of its falling. In about two hours after, while deceased was crossing the breast to where Lindaur was working, it came down without any warning, falling on the deceased, inflicting such injuries as to cause his death two days after. He left a wife and two children.

Accident No. 2.—Christian G. Bader, miner, age twenty-eight years; killed at Big Mine Run colliery, by fall of coal on January 20th.

From evidence elicited at inquest, Bader and a man by name of Michael

Canary were working together. They had two cars loaded, and had drilled a hole, tamped and fired it, and went down to eat their dinner. While there, a third car was brought to them and they loaded it. Deceased then went up the breast to the face before Canary. He followed shortly after. When he (Canary) arrived at the upper heading he could see no light at the face of the breast. He hallooed, but received no answer. He then went into the next breast, outside; from there back to his own breast again, and up to the face, where he found Bader dead. His back was broken, and his bowels forced down to the bottom of his belly, causing a rupture. A large piece of coal lay beside him. He leaves a wife and two children.

ACCIDENT No. 3.—James Kane, miner, age forty years, killed at Big Mine Run colliery, by a fall of coal, February 28.

Deceased was working with a man named Michael McNally. It appears they had two cars loaded, and were putting coal in the chute to load a third. Deceased had a pick, hammer, and wedge, breaking large lumps. McNally was pushing it down the chute on sheet iron. He (McNally) was about nine or ten yards away from deceased when the coal fell on him. He left a wife and three children.

ACCIDENT No. 4.—David Stringer, miner, age thirty-three years, injured fatally at West Brookside colliery, by a fall of top slate and rock, on March 1. Died on the 4th.

By the evidence taken at the inquest, Stringer and a man named Warnock were employed robbing pillars. They had two laborers to load the coal. On the day previous to the accident, the inside boss examined the place, saw the dangerous character of the top, and ordered the deceased to take it down, which he partly did, leaving the balance hang. After the inside boss had gone away, they fired two blasts in the pillar, which caused the top to be more dangerous. Next morning, (day of accident,) after going in, Warnock commenced to work on the coal while the deceased and the two laborers were engaged shifting or moving the track, and while waiting for a rail the top fell on deceased, the effects of which caused his death four days after. He leaves a wife and three children.

ACCIDENT No. 5.—John Manly, miner, age thirty-five years, killed in Buck Ridge colliery, by a fall of top slate, on March 8.

Deceased and his brother-in-law, Patrick Curry, were working together in a breast. After going into work on the morning of the accident, Curry commenced to shovel coal, and deceased started to drill a hole. When he had the hole drilled in a short distance, he said to Curry, "You drill, and I will shovel." Curry handed him the shovel, and went across the breast to where he was to drill the hole, and was in the act of picking up the scraper to clean out the hole when the fall of top slate (fire-clay) occurred, covering Manly and killing him instantly. It was calculated that two holes or blasts more would finish the breast. He leaves a wife.

ACCIDENT No. 6.—Frank Fox, miner, age forty-one years, killed in West Brookside colliery by a fall of top slate, March 16.

Deceased, with two other men, Lyman Henry and Charles Green, were working in what is known as a buggy breast. After going into work in the morning, deceased commenced to drill a hole, while Henry and Green were loading buggies or small cars and running them down, dumping the coal into a chute, to be loaded into the mine cars. After he (the deceased) had the whole completed and fired, Henry drilled a second hole and fired it. The deceased then went to dress off the loose coal, when the slate commenced to crack and work. He stepped down from the face to go away, when it fell on him, killing him almost instantly. He leaves a wife and seven children.

Accident No. 7.—Adam Kissikuski, laborer, age forty-three years, killed in Enterprise colliery, by a fall of top-slate, (fire-clay,) on March 22. Deceased was working with a miner named Dominick Muschavitz, driving or working in a back switch gangway. On day of accident, they had worked until about one o'clock, P. M., blasting up bottom-rock; then they laid a road; after which they fired two shots, or blasts, in coal. Muschavitz dressed off the loose coal after the shots, and sounded the slate; it sounded good. Deceased was shoveling coal into a car, when this piece of slate (fire-clay) fell on him, killing him instantly. Leaves a wife and one child.

Accident No. 8.—John Mitchell, miner, age forty-six years, killed in Big Mine Run colliery, by a fall of bone coal, April 20. Deceased and his partner, Yocum Blank, about four o'clock, P. M., of day of accident, were working in their breast, shoveling coal into a buggy, or small mine car, when a large lump of bone coal fell from top on deceased, killing him almost instantly. By the evidence adduced at inquest, the inside foreman ordered deceased and his partner to take it down or prop it, which they failed to do. This is another of the accidents which might have been avoided if that care and prudence had been taken which should have been. He leaves a wife and four children.

Accident No. 9.—James F. Boutilier, miner, age thirty-two years, injured severely, in Henry Clay drift, by a fall of coal and slate, on April 25. Died next day. Deceased and seven or eight other men were engaged robbing out the drift. Shortly before twelve o'clock on day of accident, deceased was drilling a hole, preparatory to firing a blast. He told one of his partners, a man by the name of Robert Allison, to make up a cartridge of powder for the hole he was drilling. When Allison got to the box where the powder was, he heard the fall. He ran back, and found deceased was under a large mass of coal and slate. He lived until next morning. He left a wife and three children to mourn his sad loss.

Accident No. 10.—James McNeilus, driver, age sixteen years, killed in Pennsylvania colliery, by being caught between fall of coal and a mine car, on April 13. Deceased was employed as driver; was taking a wagon in along the gangway with his mule; when within about fifty yards of gangway face, he was passing his mule out between car and low side of gangway, to take the car up a slant gangway. A slip of coal fell out of low side, covering him, and killing him instantly.

ACCIDENT No. 11.—William Fagan, miner, age thirty-six years, killed in West Brookside colliery, by a fall of top slate, May 17. Deceased was employed, with two other men, named John Chupp and William F. Paul, between seven and eight o'clock, A. M., robbing pillars. Chupp was drilling a hole, preparatory to firing a shot, and Paul and deceased were loading the second buggy after commencing work, when the piece of slate, without giving any warning, fell on the deceased, killing him almost instantly. He was unmarried.

ACCIDENT No. 12.—Peter Miller, miner, age forty-six years, killed in Williamstown colliery, June 10, by a fall of top slate. The deceased and his brother, Jacob, were employed robbing a pillar in No. 2 slope, east gangway workings. On arriving at their work in the morning, they commenced to pick up some bottom coal, to get standing room to bar down the slate. After some fruitless efforts, they decided to drill a hole in the coal under the slate, supposing the jar of the shot would cause the slate to fall, it being cracked and broken in over the coal. Deceased had the hole drilled through the coal and six inches up through the slate, when it fell on him, killing him instantly. He leaves a wife and eight children.

ACCIDENT No. 13.—Michael Bernoskie, miner, age forty-one years, killed in Luke Fidler colliery, July 11, by a fall of top coal and slate.

Michael Bernoskie and John Potroskie were working together in a breast; they fired a blast first after commencing work in the morning. They then loaded three cars of coal, when Potroskie went down the breast towards the gangway for something. He wasn't there many minutes when the boy, who was pushing coal, come running down the breast and told him that Bernoskie was covered up by a fall of coal at face of breast. Potroskie run back up breast, and, with the assistance of two other men, named Peter Kissinger and John Hayes, who were working in next breast, cleared the coal and slate off of Bernoskie. When they found him he was still breathing, but died shortly after. He left a wife and seven children. This is another one of those accidents which might have been avoided had the parties not trusted so much to their safety by working under over hanging dangerous top coal and slate.

ACCIDENT No. 14.—Christian Cleaver, miner, age forty-four years, leg and arm broken, and otherwise injured about the body, by a fall of top slate and bone coal, in Merrian colliery, on July 18. Died on the 24th.

The deceased and Joseph Nickish were working in a breast in the Skidmore vein. After starting work in the morning, they placed a prop under the piece, which fell afterwards, after which they fired a shot, which knocked the prop out; shortly after they went back up breast, saw the prop had been knocked out, but did not sound the top. Deceased commenced to put coal into chute, and Nickish drilled and tamped a hole in a heading which they were driving. When he had the hole completed he went to help deceased to put coal down chute, unmindful of sounding the top. They had not been working together more than a quarter of an hour, when

the top fell on deceased, inflicting such injuries as to cause his death in six days afterwards. He leaves a wife and seven children.

Accident No. 15.—Thomas Londrigan, miner, age twenty-seven years, single, injured seriously about the body, in Pennsylvania colliery, by a fall of coal and slate on July 16. Died on August 9. Londrigan and a man by the name of Lotshaw, on the evening previous to day of accident, fired two shots or blasts, one near each pillar. Next morning Lotshaw went up to face to dress off the loose coal from the blast at his side of breast, deceased put in a step in his manway before going up to face. When he had the step put in, he went up and commenced to dress off the loose coal after his shot. He first got a drill and tried to bar down a large piece of coal and slate, but failed to do so. Then he took a pick and commenced to cut it down. He was not more than two or three minutes working with the pick, when the whole mass of coal and slate fell on him, causing such injuries to him as resulted in death in twenty-four days after.

Accident No. 16.—Richard Morris, miner, age twenty-six years, was injured severely in Henry Clay shaft colliery, on August 27, by a fall of bone coal and slate. Died in two days after. Deceased and a man by the name of Hugh Roberts were working in one of the east plane west gangway. Shortly after dinner Morris commenced to bar down with a drill some loose bone coal and slate which was over gangway near face, Roberts showing him light. He was standing inside of it, near face, on high side, when it was about to fall. Fearful of its falling over on him, he put the drill before it, and, falling on the drill, the tamping end striking him in the groin, inflicting such injuries as to cause his death in two days after. He left a wife and two children.

Accident No. 17.—Henry Witt, laborer, age thirty years, killed in Monitor colliery by a fall of coal on October 11. Deceased was working with a man by the name of James Dunlevy, a miner. They had three shots fired, and the fourth car in and loading it, when the coal, without, giving any warning by cracking or working, fell on Witt, covering him and killing him instantly, knocking Dunlevy between high side of breast and mine car.

Accident No. 18.—John Barufskie, laborer, aged forty years, killed at Mt. Carmel shaft near Mt. Carmel, by a fall of top coal, on October 25. By the evidence put forth at inquest, deceased was working with a miner by the name of John Meade. They were working together only four days, previous to Barufskie going to work with Meade. A man by the name of Edward Foley worked with him. When Foley left, or shortly before, Meade asked the inside foreman to send him another man. He, the inside foreman, sent Barufskie, (a Polishmen,) who could speak no English. Meade was an Irishman, and could speak no Polish. On morning of accident deceased was in at work before Meade, and loading a car. Meade testified at inquest that he heard something drop. He (Meade) took deceased back to a cross-heading, a place of safety, and made signs to him to stop there and not leave it. Meade went back to breast and got a drill, and was sounding the

top coal when it fell, driving the drill through his shirt and falling on Barufskie, killing him instantly. This is an accident which, in all probability, would have been avoided had those men understood each other. Meade taking Barufskie back to the cross-heading, a place of safety, when he (Meade) discovered the character of the place to be dangerous, and making signs to him (Barufskie) to stop there until he (Meade) would go and make it safe by barring down all overhanging top coal. Barufskie not understanding him, followed him, which he undoubtedly would not have done had he understood Meade. Superintendents and bosses, when putting men to work in dangerous places, should always put men together who understand each other. Barufskie left a wife and seven children.

ACCIDENT No. 19.—John Connor, miner, age forty-five years, killed in Hazle Dell colliery, by a fall of coal, on November 30. Deceased, and a man by the name of William Riley, were working together. By the evidence adduced at inquest, the accident occurred about twelve o'clock, M. Deceased was putting down coal to loader, who was loading the third car, when the fall took place, which inflicted injuries of such a nature as to cause death in about half an hour after. He left a wife and three children.

ACCIDENT No. 20.— John Visoki, laborer, age thirty-four years, killed in Mount Carmel colliery by a fall of top coal, on December 23. A miner, by the name of John Bornoski, was working with deceased in a breast. After going in to work in the morning, they fired a blast in the blowing bench, then sounded the top coal, or what was loose of it, and loaded two cars; fired another hole, and loaded two more cars; took the pick and was picking up some bottom coal at face. Deceased was shoveling it back, preparatory to loading it into car, when, without giving notice, a bench of coal about one foot thick and about eight feet wide and about six feet deep, fell, killing Visoki instantly. He leaves a wife and three children in Hungary, he being a Hungarian.

Fatal Accidents by Mine Cars.

ACCIDENT No. 1.—John McDermott, miner, age forty-four years, fatally injured in Lykens Valley colliery, on January 3. Died on February 18. Deceased was riding in a car going in to work in the morning. He put his arm up on side top rail of car, which was caught between car and a prop on high side of gangway, drawing the skin and flesh off arm from wrist to near elbow, and otherwise injuring arm so as to render amputation necessary, which was performed on the 7th. He died on February 18; left a wife and seven children.

ACCIDENT No. 2.—Francis Hain, laborer, age twenty-five years, injured in Williamstown colliery, on March 15. By the evidence it appears deceased and another man by the name of Albert Yoder were running a loaded car down what is known as the No. 2 slope, east gangway slant. While running it down, a sprag which was in a wheel, on upper or high side of gangway, caught against a low platform, thereby knocking the sprag

out. Shortly after they discovered the car increasing in speed, Yoder looked to see if the sprag was in its place. Found it was not. Both standing on the hind bumpers, Yoder told deceased to put in his sprag, which he did, the car still increasing in speed. Hain said to Yoder, "this car is going very fast," to which Yoder replied in the affirmative. He (Hain) then said "let us jump off." Shortly after, Yoder jumped off. The car run about four or five yards further, then jumped the track, throwing deceased under it, receiving such injuries as to cause death in five days after.

Accident No. 3.—Edward Wagner, laborer, aged twenty-one years, seriously injured by being jammed between the bumpers of two loaded mine cars, in Logan colliery, March 22. Died in about eight hours after accident. Deceased was employed as an inside loader, about four and a half o'clock, p. m., after loading a car he stood on bumper, waiting for the car inside, which was being pushed out to it. He stood on the inside bumper of his car, and as the other car was nearing his, he attempted to step on it, but missed, thereby getting his leg crushed in such a manner as to cause his death in the time specified after accident. He was a single man.

Accident No. 4.—John Carroll, driver, age twenty-one years, killed by being crushed between a mine car and chute in Pennsylvania colliery, on April 8. Shortly before dinner time deceased, in company with a door-tender named Hanrahan, was coming in with an empty trip, both standing on the front bumper of first car. Hanrahan jumped off to open a door. Carroll looked back. He thought Hanrahan was under the cars. While looking back he was caught between the front car and a chute, and received injuries which resulted in death in a short time after accident. He was a single man.

Accident No. 5.—Leonard Deiring, carpenter, age sixty years, killed in Pennsylvania colliery, by being run over by empty mine cars while traveling down slope, on April 25. By the evidence it appears the deceased was traveling down slope to do some repairing to drums that had been put up at or near middle lift to prevent the ropes from cutting into slope collars. Previous to his going down slope he was on his way going down traveling-way. He turned back, and said he would ride down the slope as far as the upper level. He told Robert Penman, the engineer, to hoist slow that he was going to ride down slope as far as the upper level, that he would get off there and walk the balance of the distance, viz: to middle level where the drums were. Accordingly he rode down on an empty car on west side of slope as far as upper level, and got off there. When the loaded cars, which were being hoisted at east side, passed the upper level, he crossed the slope to east side, and was traveling down. The empty cars coming down after, struck and run over him, inflicting injuries which prove fatal in a short time afterwards. He left a wife and four children to lament his sad fate.

This is another of the many accidents which might have been avoided had that care and prudence been observed which should have been. This man was on his way to go down the traveling way, and turned back to

ride down slope part of the way while loaded cars were being hoisted against him at the other side. Whereas, by going down the travelingway, which was a good one, he would have avoided this accident. Further comment unnecessary.

ACCIDENT No. 6.—Hugh McHugh, door-tender, age sixteen years, killed while riding up the No. 3, or deep, slope of the Williamstown, or Summit Branch, colliery, on July 19. By the evidence produced at inquest, there were eight men riding up slope at time of accident. Deceased was sitting on spreader chain. When up to within about sixty or seventy yards of top of slope, deceased fell off. When found, he was under the first car, in front of the first wheel, there being two cars hoisted at each time. This is another accident which might have been avoided had deceased got into one of the cars.

ACCIDENT No. 7.—Christian Blotch, door-tender, age sixteen years, killed at Monitor colliery, by being crushed between empty and loaded mine cars, at bottom of slope, on August 19. The deceased and a driver, by the name of Martin Keenan, were driving a mule out lower east gangway, with two loaded mine cars, to turnout at bottom of slope. When out near bottom, they stopped to turn a switch. After starting again, deceased said to Keenan, if he (Keenan) would lead the mule, he (Blotch) would unhitch. Keenan told him he did not need to unhitch. When they came on the turnout, Blotch could not find any sprags to sprag the cars. Keenan told him to look out. He (Blotch) ran to unhitch the mule. While attempting to do so, was crushed between the loaded cars which they were hauling out and empty cars which were below the center casting or frog. He died in about ten minutes after accident.

ACCIDENT No. 8.—Stanislaus Kilkoski, driver and runner, age eighteen years, killed in Mt. Carmel shaft, by a loaded mine car jumping off track, crushing him against a prop on low side of gangway, November 23. Deceased and a young man by the name of Haffey were driving and running empty and loaded cars in No. 1 slant gangway. When they had done their day's work, in the evening, he (Haffey) told deceased to put his mule in the stable and go home; that he (Haffey) would go in with two other boys, named Morgan and Morrison, who had to make another trip, and help them. He (Kilkoski) said he would go in for a ride. Accordingly, they all went in, and were returning with a trip of six cars. Haffey and Kilkoski rode out on the front bumper of the first car. On their way out, the front car jumped off the track to low side, against prop, crushing deceased, by which he received injuries about the head and body, which caused death in a short time afterwards.

ACCIDENT No. 9.—Elias Long, driver, age eighteen years, injured in Burnside colliery, on December 5, by being crushed by loaded mine cars, while coupling them. Died on the 12th. It appears there were two loaded cars standing at a certain point, in what is known as the lower No. 8 gangway slant. There were some other cars inside, which were being run down to

the outside ones, preparatory to coupling them. Deceased stood at the outside cars for the purpose of coupling them. When they bumped, he received such injuries, by being crushed between them, as caused his death in seven days after accident.

Accident No. 10.—Levi Enty, driver, age nineteen years, killed by being crushed between loaded mine cars and top rock in Big Mountain colliery, December 17.

Deceased, at time of accident, was engaged as a night driver. About four o'clock, A. M., he was driving a trip of four cars out the No. 4 or straight drift, No. 9 vein, at a point about two hundred yards; inside of drift-mouth he had to put in sprags, which he did, and in attempting to get on the car he was dragged about twelve feet, to a point where he was caught between the cars and top rock and instantly killed.

Fatal Accidents by Explosions of C. H. Gas.

Accident No. 1.—James Gallagher, miner, age thirty-two years, burned on head, face, and body by an explosion of carbureted hydrogen gas, in Monitor colliery, on February 14. Died next day.

Deceased and his partner, Michael Horey, were working in breast No. 73, lower east gangway; on morning of accident they went in to work about six and a half o'clock, and were on their way going up to face, Gallagher in advance about eighteen or twenty yards. When within about five or six yards of face, gas exploded, burning Gallagher, and inflicting injuries of such a character as to cause his death next day. Left a wife and five children.

By the evidence taken at inquest there was never any gas seen in there before.

Accident No. 2.—Michael Kreiger, laborer, age twenty-six years, injured seriously in Big Mountain colliery by being burned by an explosion of carbureted hydrogen gas, on June 27. Died on July 5.

Two men, by the names of John and Thomas Gillespie, were driving an air-hole in Big Mountain colliery slope. On the morning of the accident they went to the inside foreman, William Llewellyn, for a man to turn fan to blow out some gas which was in their place. Llewellyn sent deceased with them; after turning the fan for some time, they (the Gillespies) concluded the place was clear, started out of heading when deceased was turning the fan up the air-hole—they say with safety lamps, although deceased testified before his death, that the lamps which they had were naked lamps. They had not gone far when the gas exploded, burning themselves and deceased. The latter died of injuries received in eight days after accident.

This is another of the accidents which might have been avoided had a due observance of the eighth section of the mine law been observed. When it says: "He or his assistants shall examine carefully the workings of all mines generating explosive gases every morning before the miners enter the coal mine or colliery, and shall ascertain that the mine is free from

danger, and the workmen shall not enter the mine until such examination is made and reported, and the cause of danger, if any exist, be removed." This has not been complied with by either boss or workman in this case.

ACCIDENT No. 3.—John Scott, fire boss, age thirty-nine years, killed in Keystone colliery by an explosion of carbureted hydrogen gas, on September 10. On afternoon of day of accident the colliery was stopped to make steam and water connection for four new boilers, which had been put in place. This necessitated the stoppage of the fan also that afternoon. About sixty feet west of hoisting slope, and about two hundred feet west of pump slope was a dam to hold the water of the old level west gangway. The water on that afternoon was running east across hoisting slope, fanway, and pump slope to sump east of pump slope. According to the evidence adduced at inquest, Mr. Samuels, (inside foreman,) told deceased to go down and shut off the water. When Scott was on top of hoisting slope, preparatory to going down, John Epley (topman) noticed that while he had a safety lamp in his hand, he also had a naked lamp burning on his hat on his head. Epley called Scott's attention to the naked light, and said to him that no naked lights were allowed down the slope; not heeding Epley, he started down to the pump slope with the naked light. In a short time afterwards the explosion occurred, which killed him. When found he was about fifteen feet east of pump-slope, lying partly on his left side, with his legs doubled back over his head. His right leg was broken between the knee and hip, left leg broken between knee and ankle, and left arm broken between elbow and shoulder. There was a bad wound on the left side of head, near the temple, and was considerably burned about the head, neck, and arms. He left a wife and six children to mourn his sad loss. I cannot find language strong enough to condemn such rash acts.

ACCIDENT No. 4.—Peter Voglegasang, miner, age thirty-two years, burned on head, face, neck, hands, and body, in Merriam colliery, by an explosion of carbureted hydrogen gas, on December 19; died on the 27th.

It appears that Voglegasang and another man by the name of Jacob Glessner were driving chutes and headings in west gangway of Mammoth vein. On morning of accident the fire boss (Valentine Young) forbid deceased to go into chute, that there was gas in it, but to go and help his partner to drive the cross-heading, from the chute outside, inwards, and not to attempt to go into this particular chute, until he would remove the gas. Not heeding this warning of the fire boss, he left where he was working, went down on gangway, went into chute, pulled off his shirts, and commenced to brush out the gas, and drove it down on a naked light which he stuck on a gangway leg at chute, exploding the gas, burning himself as above stated. He left a wife and three children.

Fatal Accidents from Explosions of Powder.

ACCIDENT No. 1.—Edward Smith, miner, age twenty-seven years, injured severely by being burned by an explosion of powder in Franklin colliery, February 23; died March 2. Leaves a wife.

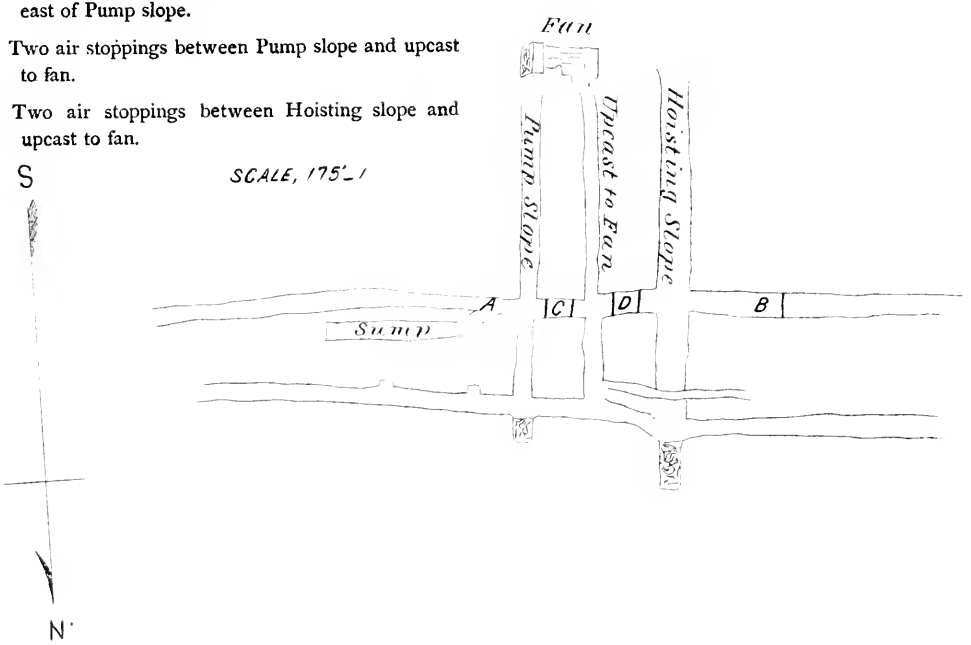
Reference:

A. Where Scott was found after Explosion.

B. Dam in old level west of Hoisting slope where he was going to shut off the water that was running across the two slopes, and upcast to fan to sump, east of Pump slope.

C. Two air stoppings between Pump slope and upcast to fan.

D. Two air stoppings between Hoisting slope and upcast to fan.



Accident No. 2.—John A. Snyder, miner, age twenty-six years, injured severely by being burned by an explosion of powder in Franklin colliery, February 23; died March 9.

About half past four o'clock, P. M., John Fegley and Martin Shitzley were traveling out the gangway on their way home, after having done their day's work, when passing Smith and Snyder, who were standing together, Shitzley saw Smith put his naked light to some loose powder that was laying on the gangway, igniting it, and exploding about a keg and a half of powder, which was near by, burning the four, which resulted in the death of Smith and Snyder, as above stated.

Smothered by Rush of Loose Coal and Dirt.

Accident No. 1.—Joseph Armstrong, laborer, age twenty-nine years, killed in Big Mountain colliery, by being suffocated, by loose coal and dirt, while riding out gangway on hind end of loaded trip of mine cars, on April 26.

By the evidence produced, deceased was employed carrying rock drills for men who were driving a tunnel. He was standing on the hind end of a loaded trip of three cars, going out in company with a loader named John Forbes. He (Forbes) testified that the coal on the first car caught against chute, tearing out the chute board, letting the loose coal and dirt run out on the tops of the loaded cars as they were passing by. After passing out through it, he missed Armstrong. He called to the driver, and they went back. The chute was still running. They called for help and stopped the chute. When deceased was found life was extinct. He left a wife and one child.

Accident No. 2.—George Slaughterback, miner, age twenty years, killed in Franklin colliery by being smothered by a rush of coal and dirt while robbing pillars, on October 11. Slaughterback and a man by the name of Daniel Strausser were working together, robbing pillars. On day of accident, they had the pillars between breasts Nos. 56 and 57 cut through to within about four feet. Inside, next No. 57, they drilled a hole outwards towards No. 56, for the purpose of cutting it through, but the shot did not work as well as was expected, so they drilled a second hole and fired it. It did not accomplish the work intended. After a short while, Strausser went up the inside manway of No. 56, deceased went up outside manway of No. 57, and commenced to work with a pick. The loose coal and dirt out of No. 57 rushed into manway on him and smothered him.

Accident No. 3.—Thomas Lord, fire boss, aged fifty-six years, killed in Lykens Valley colliery by falling down coal chute, while starting a battery, the coal rushing on him and smothering him, on October 20. First trip in the morning James Smiles loaded a car at chute and emptied it; he told Charles Martin to tell Thomas Lord the chute was empty, between the hours of ten and eleven o'clock, A. M. Smiles loaded another car out of it,

coupled it, and another car which Martin had loaded at another chute, together, and took them out to turnout. Shortly afterward they took in two more cars to load at the same place; had the first loaded and the second about three fourths full. Smiles went up to check the battery, which was blocked, to start it, when he saw a man's legs protruding out from under the battery. It is evident that between the time that Martin told him that the chute was empty, and the finding of him in the same, he had gone up and started the main coal battery, which was up at the upper side of first cross-heading. In doing so a check battery on lower side of heading which he was standing on gave way, precipitating him down the chute, the coal rushing down on him and smothering him. He left a wife and three children to mourn his sad loss.

Fatal Accident by a Premature Blast.

Thomas Horan, miner, aged fifty-five years, killed in Locust Gap colliery by a premature blast, June 25. The deceased was working at night in a breast with a man by the name of Bernard Cannon. About three o'clock on the morning of the accident they had two holes drilled and tamped. Cannon fired his first. Shortly after Horan went up from the heading to fire his, and had been gone but a short time when the blast went off. Cannon hurried up from the heading, and found him about eight yards down the breast from the face, lying on his back, bleeding from the forehead and back of the head. He was fearfully cut about the head and face. When found there were no signs of life. He left a wife and six children.

Fatal Accidents from Miscellaneous Causes Underground.

ACCIDENT No. 1.—John Fox, carpenter, aged thirty-five years, suffocated by exhaust steam from steam pump, in Cameron colliery, February 16. Deceased, and an engineer named James C. Smith, went down into the mine between four and five o'clock, P. M., on the 15th, to examine the column pipe of a steam pump, which had been leaking. Fox went down the traveling way, and was to come into the hole at the bottom of the pump-way. Smith went down the slope and went into the pump engine-house, and waited there until he thought Fox had time to be at the hole at the bottom of the pump-way. Smith stopped the pump and went up the pump-way towards the hole. Fox called to him and asked him if he was there, when Smith told him to come up. He said he could not come through. Smith went up the pump-way a short distance, and then returned and started the pump. At the time they spoke to each other they were about twenty-five or thirty feet apart. The hole which Fox was at the bottom of is from the No. 8, up across the measures to the No. 9 vein. The pump-way is in the No. 9 vein. On the morning after, James Visick and another man, after fixing the column pipe, went up the pump-way, about forty yards, and found his (Fox's) lantern. They went up about twenty-five yards further and found his body. He was lying on his back, head up the pitch, and his feet resting on a plank. He left a wife and four children.

Accident No. 2.—James Rice, laborer, age fifty-one years, killed in Pennsylvania colliery by falling down manway, August 25. Deceased was working with a man by the name of James Cannon. They were, after eating their dinner and going up to work, taking a prop, a step, and some plank with them. Cannon was first, and had the plank; deceased had the prop and step. When Cannon was up about forty yards—deceased about two yards behind—he (Cannon) heard a noise in the manway behind him; looked around, but could see no light. He came down the manway ten or fifteen yards, found the prop and step, went down and found deceased at bottom, laying half across the manway, life extinct. Single man.

Accident No. 3.—Morgan Harris, driver, age sixteen years, injured seriously about the head and face by being kicked by a mule in Henry Clay shaft, on September 22. Died on the 30th. Deceased was driving a mule out with a loaded trip of mine cars to turnout, east of bottom of shaft, coming out at inside part of turnout. The trip was moving slowly. He (Harris) gave the mule a cut with his whip, and in an instant after the mule kicked him, inflicting injuries of such a character as caused death in eight days after accident.

Accident No. 4.—John Lynch, junior, laborer, age twenty-one years, killed in Williamstown or Summit Branch colliery by being struck on side of head and face by coal, while up in inside manway of breast No. 17 of new inside slope, lower level, west gangway, on October 26. According to the evidence given at the inquest, the deceased was loading a car at inside chute of the aforementioned breast. When it was about three fourth full he went up the manway, which was beside the chute, to first cross-cut or heading, to see if there was enough of coal in the chute to load the car. While up he was struck on the side of the head by coal which was coming down the chute above him. When found by James Newton, he was lying in the manway on his right side, his head against the planks of the side of the chute; all signs of life had disappeared.

Accident No. 5.—Charles Hermon, laborer, age twenty-seven years, killed by falling out of car while riding up Merriam colliery, pump slope, on December 1. Deceased, with four other men, viz: Josiah Strohicker, Christian Leffler, John McDonald, and Francis Brennan, after having done their day's work, were riding up the slope McDonald, Leffler, and Brennan were in the front, Strohicker in the middle, and deceased in the back part. When up at a point above flat, near old level, and about eighty yards from the bottom, Brennan testified at the inquest, when passing that point he heard a noise, thought there was something wrong, looked back, and asked what was wrong. Strohicker said: "Charles has gone over." Leffler rang the bell, the engineer stopped, they got out of the car, went down the slope about twenty yards, near the flat, called to the stable boss, who was below them, "Did he see the man?" He said: "Yes, he was dead." When found, there was a cut on his forehead, blood running out of his mouth, and one of his arms was cut and broken. The day after

the accident I went to the colliery, rode down the slope in the small car with Mr. Metzinger, the inside boss, examined the place where to car was at the time he fell out down the slope. There was a space of eleven and a half inches from top of car to collar, and three feet two inches from the bottom to the top of car, making a total distance of four feet one and a half inches from the bottom of the car to the collar; therefore, it is evident that he was standing straight across the pitch, or partly so, when passing that point, the collar catching and crushing him over the back end of the top of the car, and knocking him down the slope.

ACCIDENT No. 6.—Frederick Heiber, driver, age eighteen years, injured seriously by getting his scull fractured, and otherwise injured by being struck with coal from blast while passing chute of breast in Merriam colliery, November 18. Died December 11. On day of accident, deceased was taking in an empty trip of cars with his mule in the west gangway of Skidmore vein. Joseph Pickens, who was working in breast No. 14, had put fire to a squib to fire a blast. While deceased was passing chute, the blast exploded, some of the coa' striking him on head, causing a fracture of the skull from which he died December 11. Pickens said he was in lower cross-cut, near gangway, and halloed fire several times. On all such occasions, the proper way to do when the face of a breast is not far up, and having no battery, is for one man to come down on gangway, and give notice of their going to fire.

Fatal Accidents from Miscellaneous Causes over Ground.

ACCIDENT No. 1.—George Kachelries, slate-picker, age thirteen years, injured seriously by railroad car running over his leg at Sterling colliery, May 21. Died in a couple of days after. The deceased, with others, were pushing back a large railroad car which stood on or near center casting, so as to admit of other cars being run under breaker to be loaded. Deceased was in front pulling, while others were behind car pushing. His foot caught between a guard and main rail. The car run over his leg from heel to hip. Received such injuries as caused his death in a couple of days after accident.

ACCIDENT No. 2.—William J. Horan, laborer; age, sixteen years; injured seriously by being caught between a plank and large coal screen in breaker on July 13. Died on 16th. By the evidence adduced at inquest, the chute boss had sent deceased a short time previous to accident to take the place of a young man by the name of Burmeister, who had gone out of breaker. About two minutes previous to accident he was with a boy named Long. The chute boss, in his testimony at inquest, testified that deceased had no business going to the place where accident occurred; that he was out of his place. While being caught, he called out to a boy named Hardnock, who ran down to engineer to stop the engine. When taken out, he had a wound on left leg. He died from the injuries received on the 16th.

Falls of Coal and Roof.

The fatal casualties resulting from above causes number for the year twenty-one out of a total of forty-eight, or forty-three and three fourths per cent. The non-fatal casualties from the same source were thirty-seven out of a total of one hundred and forty-seven, being a little over twenty-five per cent. of the entire casualties.

Upon reviewing the evidence elicited at the several inquests, thirty per cent. of the fatal casualties of this class could have been avoided, had that care and prudence been exercised which should have been. The safety of a miner's working place evidently depends on the miner himself, the care and watchfulness which he exercises in keeping his place safe by timely propping and timbering, as well as the barring and blasting down all dangerous overhanging top coal and slate.

It is true that men who are exposed or inured to danger as they are in the mines become so accustomed to it that they get careless and neglectful in keeping themselves secure, which otherwise would not be lost sight of.

Careful supervision of the mines on the part of those in charge is of the greatest importance in this particular: To see that the miners keep their working places in a safe and workmanlike condition by properly securing themselves against danger. In my inspection or examination of the inside workings of the collieries of the district, I find a large percentage of the men having charge of working places who are lacking in practical knowledge and experience to enable them to keep themselves secure.

In collieries where the roof is propped across the breast, some of the props lean down the pitch too far in the head, more not down far enough, while others are leaning to either side. Such propping, in the event of pressure from the superincumbent strata, will give way, thereby endangering the lives of those working in such places.

There are men working in the mines, miners' laborers, who think they are capable of working a breast when they can drill a hole and fire it. If inside foremen, in the employing of men as miners, would make it a point to have at least one practical experienced miner in each working place, together with his watch and supervision, to see that each and every working place is properly timbered—if inside bosses adopt such a course, there would be less accidents of this class, as much coal mined, and I know of no good reason why it would not be mined as cheap—yes, cheaper—than it now is.

We know of instances where working places have been permitted to close for the want of being properly timbered. Whereas, if this had been done, the expense and danger of re-opening could have been avoided.

There is another class of miners, who place too much confidence in their ability to detect danger, running unnecessary risks, endangering their lives and that of others entrusted to their care. The recklessness, carelessness, and neglect evinced by those having charge of working places is due, in a great measure, to a desire, on their part, of sending out the greatest

amount of coal with the least possible cost or trouble, thereby endangering their lives by neglecting the timely blasting down of all dangerous overhanging coal and slate, propping bad, and unsafe roof.

There can be no clearer proof advanced than the number of fatal and non-fatal casualties recorded from year to year under this head, of the necessity of more rigid rules being adopted in the future by those having charge or supervision of the mines. As I have heretofore stated in my annual reports, the remedy for this class of casualties, to a great extent, depends on the miners themselves, the care and prudence they exercise in keeping their working places in a safe condition, together with the strict surveillance of those in charge of the mine. It is impossible for an inspector to do more than call the attention of those parties to the duty devolving upon them and give such instructions or advice as the necessity of the case may require.

Out of the twenty fatal accidents from this source there have been sixteen widows and sixty-two orphans left to eke out an existence as best they can.

It seems nothing will be effective in reducing the number of this class of accidents but strict and stringent discipline inforced by a code of special rules at each colliery, conformable to the general law, which we have advocated in former annual reports.

Explosions of Carbureted Hydrogen Gas.

There were twenty explosions of carbureted hydrogen gas in this district during the year 1881, by which four persons were fatally and twenty-four non-fatally injured. Some of the non-fatal were of a slight character. This is a decrease of four fatal and ten non-fatal, making a total decrease of fourteen from that of the year previous. It is a source of pleasure to me to be enabled to state these facts, taking into consideration the large amount of coal mined over that of the year 1880. Although the number of this class of accidents has diminished from that of the year preceding it, it is sad to contemplate the cause by which some have occurred. It is very unpleasant to have to repeat this state of facts year after year. However, we feel it is a duty we owe to the present and future workers in our coal mines, hoping it will have the desired effect of diminishing this class of accidents in the future.

The remarks made on casualties of this nature, for the year 1880, are as applicable to the accidents of 1881 as they were then to those of 1880. By a very limited amount of care and prudence, their occurrence could have been prevented. At least fifty-nine per cent. were attributable to neglect, carelessness, and recklessness, some of a character most daring. This may be considered severe, nevertheless it is true, as will be shown hereafter in reviewing their several causes.

The explosions of gas at Cameron colliery, on May 23 and 27, October 24, and November 11, by which eight men were burned.

At Big Mountain colliery, on June 23 and 27 and October 6, by which six men were burned. One died, from injuries received, in eight days after.

At Keystone colliery, September 10, by which John Scott (fire boss) was killed.

At Merriam colliery, December 19, by which Peter Voglegasang received injuries, from which he died in eight days after. At same colliery, on December 28, by which William West and Thomas McManamon were burned, were, without exception, the result of neglect, carelessness, and recklessness, in some cases, on the part of the men, and in others on the part of those having charge of the colliery.

The explosions of gas in Cameron colliery, on May 23 and 27, October 24, and November 11, by which eight men were burned, were the result of carelessness and neglect, on the part of both men and those in charge of the colliery. On May 23, after the two men had gone in to work, in the morning, one of them commenced to brush out some gas, with his coat, which they found at face of breast, the other went down the breast a short distance, with a safety lamp in his hand; they had not been brushing long when the explosion took place, burning both of them.

Had the eighth section of the mine law been observed this accident would not have occurred; where it says, "He (the fire boss) or his assistants shall examine carefully the workings of all mines generating explosive gases, every morning before the miners enter the coal mine or colliery, and shall ascertain that the mine is free from danger, and the workmen shall not enter the mine until such examination is made and reported, and the cause of danger, if any exist, be removed."

Had this been done the explosion would not have taken place.

Brushing gas is not removing the danger. The proper way to brush gas and remove the danger is to circulate the air current to the face of the workings. That will brush it and keep it brushed.

That on October 24 was caused by a fall of top coal, bringing down some gas, which had accumulated at the top of a finished breast, on the men while passing out the gangway. Their injuries were of a slight character. However the practice of allowing gas to accumulate in finished workings is a pernicious one, and should not be tolerated by those in charge of the colliery, as it may result in loss of life and destruction of property.

On November 11, in same colliery, two men, while working in a breast, neglected to make up the brattice to circulate the air current to face of breast, thereby allowing gas to gather, which was ignited by a naked lamp that one of them was using, burning both men.

On the 23d of June an explosion of gas occurred at Big Mountain colliery, by which two men were burned. They were driving an air-hole in in slope. On morning of accident after going in to work, one of them went into a cross-cut, which was driven inside of air-hole, ignited some gas, which was there with his naked light. The place had not been examined that morning previous to their entering it.

On the 27th of the same month, in same place, three men were burned. One of them died in eight days after. On morning of accident previous to their going up to work in air-hole, they stopped in a cross-cut, which was driven from slope to air-hole, about ten or twelve yards up from bottom of slope; one of their number started to turn a fan to blow out some gas which was in hole. After turning the fan some time, they concluded the place was cleared, they started up the hole, leaving the third man turning the fan, when they had proceeded a short distance from cross-cut, the gas exploded, burning the three of them. The man who was turning the fan died from injuries received in eight days afterwards.

In my investigation of this case the two men who were going up the hole said they were safety lamps which they had. The man at the fan testified that they were naked lamps. The place had not been examined by the inside boss or his assistants that morning previous to the men entering it.

On October 6, at same colliery, another explosion of gas occurred by which one man was badly burned. On the morning of accident previous to going into work, this man asked the fire-boss if he had examined his place, to which he replied that he had not yet. This man and his partner continued on their way in to work, drilled a hole in a chute, which they were driving, charged and tamped it. One of them was in the act of going up a chute near by to show his partner light to get away from the blast after lighting the match, when up the chute, a short distance from the gangway, he ignited some gas which was in chute, burning himself severely on the head, face, neck, hands, and arms.

In the cases of Scott and Voglegasang, (see fatal accidents under the head of explosions of carbureted hydrogen gas.)

On December 28, an explosion of gas occurred in Merriam colliery, by which two men were burned. They were working together in a breast. After firing a blast, they went back up to face, without taking their safety lamps, to see if there was gas present. In doing so, they fired the gas which burned both of them.

Mine Cars and Machinery.

Nine lives were lost through the above causes during the year, or eighteen and three fourths per cent. of the fatal casualties, against seven lives lost from same causes for the year 1880, being an increase of two. Twenty-seven persons were injured during the year, against eighteen the preceding year, an increase of nine, or eighteen and one half per cent. of total injured, an increase of four per cent. as compared with the non-fatal casualties of this class for the year previous.

Six of the above fatal casualties were the result of recklessness. By a reasonable amount of care they could have been avoided. Thus increasing the necessity of more stringent rules being adopted in the discipline of coal mines. It is unnecessary to further comment on accidents of this class.

For further particulars see fatal accidents under this head.

Ventilation.

It is a source of pleasure to me to be able to state that the condition of the collieries of this district, as far as ventilation is concerned, is improving rapidly. There were four fans put up during the year.

One at Tunnel colliery, by the Philadelphia and Reading Coal and Iron Company, eighteen feet. One at Merriam colliery, by same company, eighteen feet. One at Big Mountain colliery, near Shamokin, by Patterson & Llewellyn, sixteen feet. One at Williamstown colliery, by the Summit Branch Railroad Company, fourteen feet. Making in all fifty-three fans in the district, which comprises fifty collieries of all classes. Yet there is room for improvement in some of the collieries of the district, principally in those which do not generate carbureted hydrogen gas. The necessary appliances to circulate air to the face of working places, such as gangways, chutes, and headings, and other narrow workings, are still lacking. Some parties, having charge of the inside workings of this class of collieries, still cling to the old idea, that it is not necessary to circulate air to the face of those places, especially when it involves a little trouble and expense, such as the putting up of doors, brattice, or air-pipes. When a strong current of air is passing the face of all working places, carrying off powder smoke and all the noxious gases emitted by the coal, lamps, the breathing of men and animals, the miners are better able to do a good day's work than when compelled to work in an atmosphere of powder smoke and vitiated air. In collieries where the air current is circulated to the face of all working places, the miners are enabled to return to their work in a short time after the firing of blasts, detect overhanging, dangerous top coal slate, etc., perform more work in a given time, thereby contributing to the welfare of themselves and their employer. The men employed as inside foremen, upon whose intelligence of the various modes of working and ventilating the different seams or veins of coal, depend the health and safety of the men under their charge, together with the welfare of their employers. No matter how good a vein of coal may be, if not worked and ventilated intelligently and properly, will jeopardize the health and safety of the men, entail loss to the operator in decreasing his profits, which otherwise accrue. In a certain district there was a certain colliery, some time ago, which could not produce more than one hundred and fifty or one hundred and sixty mine cars of coal daily. The inspector visited it and found the ventilation inadequate, and improperly circulated. He requested a fan to be put up, (erected,) which was complied with. After being put up and run, the colliery commenced to increase its shipments until it reached three hundred, and as high as three hundred and twenty mine cars daily. In less than two months after being put up, the superintendent admitted that it had more than paid for itself then. Here are some of the benefits to be derived to the operator by proper and adequate ventilation.

Taking the district as a whole, during the four years of my term, I think I can safely say that the improvements made during that time, in advanc-

ing the condition of the collieries up to the requirements of the ventilation law is of a very satisfactory character. In this respect, I don't think it is necessary for me, at present, to make special mention of any certain collieries, as I have done this in my previous reports, they still holding the same position.

Prosecutions for Violations of Law.

It is one of the most disagreeable and unpleasant duties of an Inspector to be compelled to enter criminal proceedings against those who never did him an injury in their lifetime. However, such is the position of an Inspector. When he sees the law violated deliberately, time and again, after giving due notice. If he does anything like his duty to the public and to himself, he is bound to prosecute, according to his oath of office.

We have done all that we reasonably could to avoid, if possible, the disagreeable duty of compelling or forcing compliance, after being appointed. The law was posted up at every colliery in the district, together with distributing about six thousand copies in pamphlet form among superintendents, bosses, and workingmen, so as to enable all to become familiar with the requirements of the ventilation act. Besides, on various occasions, when seeing parties acting contrary to its provisions, calling their attention to the fact of their doing wrong, and admonishing them to be more careful in the future.

Finding those measures not accomplishing the desired effect, we concluded to pursue another course by resorting to legal means. There were six cases brought to the attention of the courts in the year—three in Northumberland, two in Dauphin, and one in Columbia county. The first was Henry Rickert and Henry Rubendoll, on March 23, riding on loaded cars up No. 3 slope of the Summit Branch colliery, in Williams township, Dauphin county. A true bill was found by the grand jury, on April 28. The case was postponed until the August sessions. They admitted their guilt, and requested a settlement, which was granted, by their paying the costs, at Harrisburg.

Second, Thomas Hannon, on March 26, riding up dirt plane on loaded car, at Cameron colliery, near Shamokin, Northumberland county.

Third, John Thompson, April 7, at Luke Fidler colliery, same county, riding up water level tunnel slope and plane, to breaker top, on loaded mine car.

Fourth, William Rhinehart, assistant mine boss, April 15, riding up No. 9 slope, Cameron colliery, near Shamokin, on loaded mine car. On May 5, the grand jury of Northumberland county, at Sunbury, found true bills in each of the three latter cases. On the day after, May 6, Rhinehart and Thompson's cases came before the court. Rhinehart's case was tried first. The jury brought in a verdict of guilty of the charge in manner and form as indicted. In the case of Thompson, the jury was empanneled, and the testimony given; he plead guilty of the charge. Rhinehart was sentenced

by His Honor, William M. Rockafeller, president judge of Northumberland county, to pay one dollar ($1) fine, costs of prosecution, and undergo an imprisonment of three hours in the county jail. Thompson was sentenced to pay one dollar ($1) fine, costs of prosecution, and undergo an imprisonment of forty-eight hours in the county jail. Hannon was called, but did not put in an appearance—he or his bailsman.

The fifth case was that of James G. Bateman, inside boss, Short Mountain and Lykens Valley colliery, Wiconisco township, Dauphin county, and Richard Holley, assistant inside boss, same colliery, for refusing to comply with section eleven of the anthracite ventilation act, as amended May 22, 1879: "And whenever ten men shall have arrived at the bottom of any shaft or slope, they shall be furnished with an empty wagon, or cage, to ride up." After having made an inspection or examination of the inside workings of the colliery, on arriving at the bottom of the Short Mountain slope, there were between forty and fifty men waiting to be hoisted up the slope. I spoke to Mr. Holley about having them furnished with an empty car to ride up, to which he replied that he could not, while there was coal to be hoisted—that he had orders to that effect. Shortly after I had an interview with his superior officers, Messrs. Bateman and Hanna, the superintendent, to which he (Hanna) replied that he would not allow ten men to be hoisted when they arrive at the bottom of the slope. Receiving such a straight-forward refusal to comply with the law, I had no other alternative left but to resort to legal measures. Accordingly, Messrs. Bateman and Holley were bound over by William H. Kendall, justice of the peace, in the sum of five hundred dollars each, to answer the charge at the next term of quarter sessions, at Harrisburg. On November 23 the grand jury ignored the bill.

REGISTER OF FATAL CASUALTIES.

DATE.	Name.	Occupation.	Name of the Collieries.	Age.	Married or Single.	Number of children.	Remarks.
Jan. 17	Joseph Cranbetz,	Miner,	North Franklin, No. 2,		Married,	2	Killed by fall of top slate.
20	Christian G. Bader,	Miner,	Big Mine Run,	28	Married,	2	Killed by fall of coal.
Feb. 14	James Gallagher,	Miner,	Monitor,		Married,	5	Fatally injured by explosion of gas.
16	John Fox,	Repairman,	Cameron,		Married,	4	Suffocated by exhaust steam from steam pump.
18	John McDermott,	Miner,	Lykens Valley,		Married,	7	Fatally injured on January 23, by having his arm caught between wagon and prop; died on February 18.
28	James Kane,	Miner,	Big Mine Run,				Killed by a fall of coal.
23	Edward Smith,	Miner,	Franklin,	27	Married,	3	Fatally injured by explosion of powder; died March 2.
Mar. 7	David Stringer,	Miner,	West Brookside,	33	Married,		Killed by a fall of top rock.
8	John Manly,	Miner,	Buck Ridge,	35	Married,		Killed by fall of top slate.
9	John A. Snyder,		Franklin,	26	Single,	1	Fatally injured; explosion of powder.
16	Frank Fox,	Miner,	West Brookside,	41	Married,	1	Killed by fall of top slate.
20	Frank Hain,	Laborer,	Williamstown,	25	Single,		Fatally injured; was thrown off mine cars while riding in gangway.
22	Edward Wagner,	Laborer,	Logan,	21	Single,		Fatally injured; leg caught between the bumpers of two loaded mine cars.
22	Adam Kussikuski,	Laborer,	Enterprise,	43	Married,		Fall of top slate.
Apr. 29	John Carroll,	Driver,	Pennsylvania,	20	Single,	4	Fatally injured; caught between mine cars and chute.
20	John Mitchel,	Miner,	Big Mine Run,	46	Married,	3	Killed by a fall of coal.
25	James F. Bontilier,	Miner,	Henry Clay,	32	Married,	3	Killed by a fall of slate.
26	Joseph Armstrong,	Laborer,	Big Mountain,	29	Married,	3	Smothered by a rush of coal and dirt.
19	Leonard Deiring,	Carpenter,	Pennsylvania,	60			Fatally injured; run over by empty mine cars.
13	James McNulus,	Driver,	Pennsylvania,		Single,		Killed by a fall of coal.
May 27	William Fagan,	Miner,	West Brookside,	36	Single,		Killed by a fall of coal.
11	George Kachelries,	Slate picker,	Sterling,	13			Fatally injured; run over by railroad car; died same day.
June 30	Peter Miller,	Miner,	Williamstown,	46	Married,	8	Killed; fall of slate.
5	Thomas Horan,	Miner,	Locust Gap,	55	Married,	6	Killed by a premature explosion of blast.
July 5	Michael Krieger,	Laborer,	Big Mountain,	26	Married,	3	Fatally injured by explosion of gas, on June 27; died July 5.
11	Michael Bernockie,	Miner,	Luke Fidler,	41	Married,	7	Killed by fall of slate.
13	William Horan,	Laborer,	Big Mine Run,	16			Fatally injured; caught in screen of breaker; died on 16th.
19	Hugh McHugh,	Door boy,	Williamstown,	16			Killed; fell off spreader chain while riding up slope; front car run over him.
24	Christian Cleaver,	Miner,	Merriam,	44	Married,	7	Killed by fall of coal.
Aug. 9	Thomas Loudrigan,	Miner,	Pennsylvania,	27	Single,		Fatally injured by fall of coal, July 16; back broke; died August 9.
19	Christian Blotch,	Door tender,	Monitor,	16	Single,		Killed; caught between mine cars.

Aug.	25	James Rich,	Laborer,	Pennsylvania,	51	Single,	Fatally injured ; fell down manway of breast which he was working in.
	29	Richard Morris,	Miner,	Henry Clay,	26		Killed by fall of slate.
Sept.	10	John Scott,	Fire boss,	Keystone,	39	Married,	6 Killed by explosion of carbureted hydrogen gas.
	22	Morgan Harrison,	Driver,	Henry Clay,	17	Single,	Fatally injured; kicked by a mule.
Oct.	11	GeorgeSlaughterback,	Miner,	North Franklin,	20	Single,	Smothered by a rush of coal in chute.
	11	Henry Witt,	Laborer,	Monitor,	30	Single,	Killed by a fall of coal.
	20	Thomas Lord,	Fire boss,	Lykens Valley,	56	Married,	3 Fatally injured; fell down coal chute.
	25	John Barufskie,	Laborer,	Mt. Carmel Shaft,	40	Married,	7 Killed; fall of coal.
	26	John Lynch, jr.,	Laborer,	Williamstown,	21	Single,	Fatally injured; struck on head while in manway of breast.
Nov.	23	Stanislaus Kilkoski,	Laborer,	Mt. Carmel Shaft,	17	Single,	Fatally injured; jammed between mine cars and gangway.
	30	John Connor,	Miner,	Hazel Dell,	45	Married,	3 Fall of top coal; killed.
	18	Frederick Heiber,	Driver,	Merriam,	18	Single,	Fatally injured; struck by coal; skull fractured and arm bruised.
Dec.	1	Charles Harmon,	Laborer,	Merriam,	27	Single,	Fatally injured; fell out of wagon while riding up pump slope.
	5	Elias Long,	Driver,	Burnside,	18	Single,	Fatally injured; jammed between mine cars.
	17	Levi Enty,	Driver,	Big Mountain,	19	Single,	Fatally injured; jammed between top rock and car.
	19	Peter Voglegasaug,	Miner,	Merriam,	32	Married,	3 Fatally injured; explosion of gas.
	23	John Vesoki,	Laborer,	Mt. Carmel,	34	Married,	3 Killed; fall of coal and slate.

REGISTER OF NON-FATAL CASUALTIES.

DATE.	Name.	Occupation.	Name of the collieries.	Remarks.
Jan. 3	Samuel Glass,	Miner,	Enterprise,	While cutting a rail with hammer and cutter, a piece struck him in the eye.
4	Hugh McKeon,	Miner,	Locust Spring,	Fall of coal; back injured.
6	Edward Flyn,	Slate picker,	Logan,	Leg injured and afterwards amputated; caught by coal in breaker.
11	Michael Holland,	Miner,	Merriam,	Fall of coal; toe broke.
12	William Canfield,	Miner,	Merriam,	Struck in the eye by piece of coal.
19	John Hubler,	Loader,	Locust Spring,	Leg broke; caught between car and breaker post.
21	Robert Caton,	Timber man,	Potts,	Arm mashed and leg bruised by timber falling on it; arm amputated.
24	John Davis,	Boss,	Preston, No. 3,	Hands and face burned. Explosion of oil thrown on fire by Michael Carey.
24	George Howell,	Oiler and spragger,	Preston, No. 3,	Hands and face burned. Explosion of oil thrown on fire by Michael Carey.
24	Edward Eagan,	Repairman,	Preston, No. 3,	Hands and face burned. Explosion of oil thrown on fire by Michael Carey.
24	William Jackman,	Driver,	Enterprise,	Leg bruised and small bone broke; caught between cars.
24	Thomas Ryan,	Miner,	Williamstown,	Fall of top rock.
Feb. 7	Casper Hoch,	Miner,	Burnside,	Finger broke; fell while carrying a prop.
7	John N. Lauer,	Miner,	Bear Valley,	Fall of coal; arm, neck, and shoulder bruised.
7	John Welsh,	Miner,	Williamstown,	Fall of coal; leg broke.
21	Patrick Murphy,	Bottom man,	Burnside,	Arm broke; caught between wagons.
23	Vincent Rocas,	Miner,	Luke Fidler,	Leg broke; prop fell on him.
23	John Fegley,	Miner,	Franklin,	Head, face, neck, and hands burned; explosion of powder.
23	Martin Shitzley,	Miner,	Franklin,	Head, face, neck, and hands burned; explosion of powder.
25	James Monohan,	Laborer,	North Ashland,	Fall of coal; head and back cut.
March 5	Peter Paroganski,	Laborer,	Enterprise,	Leg broke; run over by wagon.
9	Frederick Herber,	Stable man,	Merriam,	Two ribs broke; squeezed between mule and feed trough.
10	Joseph Segworth,	Miner,	Locust Spring,	Finger broke; struck with a sledge.
11	Joseph Benson,	Laborer,	Mt. Carmel,	Arm broke by mine car.
18	William Hart,	Driver,	Preston, No. 2,	Finger cut while fixing a chain on wagon.
23	Charles Reeder,	Driver,	West Brookside,	Leg broke; caught between two mine cars
24	David Fulton,	Fire boss,	Bast,	Fall of coal; ribs, back, side, and ankle bruised.
31	Joseph Rufkl,	Miner,	Luke Fidler,	Explosion of gas.
31	Joseph Hardnock,	Miner,	Bast,	Fall of coal; knuckle injured.
April 5	Robert Neihart,	Driver,	North Franklin,	Little finger broke; kicked by mule.
18	Michael Kellagher,	Miner,	Locust Gap,	Fall of coal; seriously injured.
23	Elmer Miller,	Laborer,	Williamstown,	Arm broke; caught between wagon and top rock.
26	A. N. Bergstresser,	Miner,	Locust Gap,	Badly squeezed; caught between coal and prop.
30	Walter Loyd,	Miner,	Bast,	Explosion of gas; slightly burned and seriously injured.
30	Thomas Stanton,	Miner,	Bast,	Explosion of gas; slightly burned and seriously injured.
30	Andrew Soroceo,	Laborer,	Reliance,	Arm broke; fell in a schute.
May 4	Samuel Lewis,	Miner,	Williamstown,	Premature explosion of blast.
9	John Wezrine,	Dump man,	Reliance,	Leg broke and three fingers cut off while uncoupling cars.
9	Charles Tague,	Miner,	Reliance,	Hand broke; struck with sledge.
13	Thomas Garrity,	Laborer,	Hazel Dell,	Fall of coal.
18	William Levan,	Driver,	North Ashland,	Thumb cut off while spragging wagons.
19	George Tomack,	Laborer,	Morris Ridge,	Ankle sprained; thrown in dump schute.
19			Big Mountain,	Foot sprained while loading wagon.
21	David Beveridge,	Driver,	Pennsylvania,	Leg broke while getting out of mine wagon.
23	Jacob Culp,	Miner,	Cameron, No. 9 slope,	Explosion of gas; hand, face, and neck burned.
23	Samuel Culp,	Miner,	Cameron, No. 9 slope,	Explosion of gas; hand, face, and neck burned.

	24	William Tague,	Spragger,	Reliance,	Ruptured, while lifting a mine wagon on track.
	27	Matthew Kearney,	Miner,	Cameron, No. 2,	Hands and face slightly burned; explosion of gas.
	27	Patrick Reddy,	Miner,	Cameron, No. 2,	Hands and face slightly burned; explosion of gas,
	30	Arthur Jones,	Miner,	Buck Ridge,	Hands and face slightly burned; explosion of gas.
	6	Edward Malick,	Driver,	Cameron,	Mine cars run over arm; afterwards amputated.
June	1	Jacob Peters,	Miner,	Merriam,	Fall of coal; leg broke and bruised about body.
	6	Henry Kauffman,	Miner,	Morris Ridge,	Leg injured; jammed between mine cars.
	7	William Hartlin,	Driver,	Mt. Carmel,	Kicked by a mule.
	10	William Manne,	Miner,	Bast,	Eye cut by a piece of coal.
	13	Henry Motto,	Driver,	Preston, No. 3,	Shoulder and side injured; caught between mine car and gangway.
	15	George Uhl,	Driver,	Big Mine Run,	Thumb mashed; caught between mine cars.
	21	J. Herb,	Laborer,	Peerless,	Leg broke.
	23	Ira Schappel,	Miner,	Big Mountain,	Hands, face, and neck burned; explosion of gas.
	23	Emanuel Hemminger,	Miner,	Big Mountain,	Hands, face, and neck burned; explosion of gas.
	27	John Gillespie,	Miner,	Big Mountain,	Hands, face, and neck burned; explosion of gas.
	27	Thomas Gillespie,	Miner,	Big Mountain,	Hands, face, and neck burned; explosion of gas.
	27	John E. Reese,	Miner,	Luke Fidler,	Explosion of powder, while making a cartridge.
	27	John O'Rook,	Driver,	North Franklin, No. 2,	Finger badly cut and bruised, while lifting a wagon on track.
July	8	Patrick Mullin,	Miner,	Bast,	Explosion of gas; hands, face, and neck burned.
	12	Thomas Horan,	Laborer,	Keystone,	Kicked on head by mule.
	14	Thomas Simpson,	Engineer,	North Ashland,	Fell on boiler injector, and broke a rib.
	14	John Peters,	Miner,	Bast,	Struck on head by ax, while cutting a lagging pole.
	19	Thomas Langon,	Slate-picker,	North Ashland,	Foot injured; caught in monkey rolls.
	20	Frederick Manie,	Miner,	Merriam,	Fall of coal; leg broke, head and back bruised.
	21	Patrick Cannon,	Miner,	Locust Spring,	Premature blast; face and body cut.
	22	T. P. Berger,	Miner,	Reliance,	Fall of coal; finger cut off.
	25	Edward Straub,	Topman,	West Brookside,	Finger mashed by mine car.
	26	Solomon Shuey,	Contractor,	Bear Valley,	Hand injured; wagon run over it.
	29	Charles Dabruskle,	Miner,	Henry Clay,	Explosion of gas; burned on hand and face.
	29	Nicholas McArthur,	Miner,	Henry Clay,	Leg injured; struck by a pick.
Aug.	1	C. D. Kerchoff,	Miner,	West Brookside,	Fall of coal; head cut and body injured.
	4	James Cochran,	Miner,	West Brookside,	Fall of rock; hip and body bruised.
	4	Simon Evans,	Miner,	West Brookside,	Fall of rock; head and body bruised.
	9	John Ditchie,	Miner,	Potts,	Premature explosion of blast; face cut and burned.
	11	George Billman,	Laborer,	Keystone,	Shoulder dislocated; thrown off dumper.
	12	Frederick Schramp,	Miner,	Peerless,	Explosion of gas; face and hands burned.
	13	Thomas Brennan,	Miner,	Enterprise,	Fall of coal; head and back injured.
	30	John Quinn,	Miner,	Burnside,	Explosion of gas; face and hands burned.
Sept.	2	John Minnick,	Driver,	West Brookside,	Thumb mashed; caught between bumpers of cars.
	5	Charles Teterman,	Laborer,	Montana, No. 2,	Fall of coal; body injured.
	6	George Bordell,	Laborer,	North Franklin, No. 2,	Explosion of powder; hands, arm, and side burned.
	6	Peter Ludwig,	Helper,	West Brookside,	Arm broke; struck by switch bar.
	8	Charles Tague,	Miner,	Reliance,	Foot crushed; caught between bumpers of cars.
	10	Patrick Stanton,	Miner,	Mt. Carmel,	Leg broke; knocked down by empty cars.
	12	George Billman,	Laborer,	Keystone,	Arm disjointed; struck by bumper.
	16	Henry Trefsgar,	Door-boy,	West Brookside,	Top of finger cut off by mine wagon.
	18	Arthur Heath,		Preston, No. 2,	Arm broke; a collar rolled against it.
	22	Stephen Waldron,	Miner,	Luke Fidler,	Fall of coal and slate; body injured.
	28	John Robinson,	Driver,	Luke Fidler,	Head, neck, face, and hands scalded by steam.
Oct.	3	Henry Price,	Loader,	Preston, No. 1,	Top of finger cut off; piece of coal fell on it.
	5	Herman Boy,	Topman,	Potts,	Fell off wagon.
	5	John Machel,	Driver,	Short Mountain,	Leg broken and mashed; run over by mine car.
	6	Frank McCabe,	Miner,	Big Mountain,	Explosion of gas; burned on head, face, neck, arms, and hands.

REGISTER OF NON-FATAL CASUALTIES—*Continued.*

DATE.	Names.	Occupation.	Name of the Collieries.	Remarks.
Oct. 6	James Brennan,	Driver,	Luke Fidler,	Fell off of mine cars; leg broke.
12	Henry Hause,	Laborer,	Mt. Carmel,	Toes mashed; run over by mine cars.
13	Frederick Coleman,	Door boy,	Reliance,	Hip knocked out of joint; struck by barney.
21	John Sweeney,	Miner,	Continental,	Fall of coal; leg broke.
22	Albert Evart,	Bottom man,	Reliance,	Eye injured; struck by piece of iron.
24	Frank Faust,		Cameron,	Face and neck burned; explosion of gas.
24	Theodore Katerman,	Loader,	Cameron,	Face and hands burned; explosion of gas.
24	Benjamin Chubb,	Loader,	West Brookside,	Fall of rock; back injured.
29	Samuel Filer,	Miner,	Buck Ridge,	Face, neck, and hands burned; explosion of gas.
29	William Eath,	Miner,	Buck Ridge,	Face, neck, and hands burned; explosion of gas.
31	Michael Vinson,	Door boy,	Mt. Carmel,	Arm broke; caught between cars.
Nov. 3	Jesse B. Ditty,	Shaft miner,	Mt. Carmel,	Fall of coal; leg broke.
5	Charles Grogan,	Miner,	Big Mine Run,	Fall of coal; injured seriously.
7	Edward J. Phillips,	Blacksmith,	Reliance,	End of finger cut off.
7	Charles Knecht,	Carpenter,	West Brookside,	Rib broke; struck by lever.
11	John Wilson,	Miner,	Logan,	Fall of coal; rib broke.
11	Richard Helm,	Miner,	Cameron,	Fall of coal; leg broke.
11			Cameron,	Explosion of gas; burned on hands, face, and neck.
15	D. C. Davis,	Driver,	Burnside,	Collar bone broken; jammed between wagon and gangway.
17	Thomas Gregg,	Locomotive engineer,	Continental,	Injured by locomotive.
18	Francis Bixley,	Miner,	Cameron,	Fall of coal; leg broke.
19	Francis B. Patrick,	Miner,	West Brookside,	Finger broke; struck by hammer.
22	Thomas Collihan,	Starter,	Preston, No. 3,	Premature explosion; head and hands injured.
22	Thomas Nlethamon,	Loader,	West Brookside,	Arm broken; fell on rail.
24	Daniel O. Otte,	Door boy,	Big Mountain,	Jammed between wagon and prop.
24	Frank Drill,	Miner,	Big Mountain,	Fall of coal; spine injured.
28	Patrick Kelley,	Loader,	Preston, No. 2,	Finger cut off; caught between wagon and lump of coal.
28	John Duffy,	Miner,	Preston, No. 3,	Fall of coal; hand injured.
30	David Vaughn,	Operator,	Pioneer,	Eye seriously injured by being struck by a piece of coal.
Dec. 1	John Cashman,	Laborer,	Burnside,	Fall of coal; head and back injured.
2	John Babblck,	Miner,	Luke Fidler,	Fall of coal; body injured.
2	Joseph Moodie,	Miner,	Mt. Carmel,	Four ribs broke; struck by piece of coal.
3	Jacob Sherer,	Miner,	Excelsior,	Fall of coal; back injured.
6	James Harley,	Driver,	Big Mine Run,	Body injured; squeezed between top slate and car.
7	Patrick O'Brien, jr.,	Laborer,	Preston, No. 2,	Finger broke; struck by a piece of coal.
8	John Hartman,	Miner,	North Franklin, No. 2,	Fall of coal; back bruised.
10	William F. Miller,	Bottom man,	Lykens Valley,	Head injured; jammed between mine cars.
15	John McGuirk,	Miner,	West Brookside,	Hands and face burned; while cleaning blasting barrel with squib ignited keg of powder.
15	Amos Bixler,	Laborer,	West Brookside,	Head, face, and hands burned by above cause.
16	Edward Boyle,	Miner,	Big Mine Run,	Injured by fall of coal.
20	Josiah Wabburn,	Driver,	Bear Valley,	Leg injured; dirt dumper run over him.

22	George Bevan,	Slate picker,	Centralia,	Arm seriously injured; caught in cogs of gigger in breaker.
21	Richard Brown,	Laborer,	Keystone,	Finger mashed while unloading railroad car.
23	John O'Gara,	Miner,	Bear Valley,	Finger broke; piece of coal fell on it.
28	William West,	Miner,	Merriam,	Hands and face burned; explosion of gas.
28	Thomas Manamon,	Miner,	Merriam,	Hands and face burned; explosion of gas.
30	William Nause,	Miner,	North Franklin, No. 2,	Fall of coal; head cut and badly bruised.
30	Henry Dunkl,	Laborer,	West Brookside,	Fall of slate; head cut elbow knocked out of joint.

RECAPITULATION OF FATAL CASUALTIES.

Explosions of (C. H.) gas,	4
Explosions of powder,	2
Premature blasts,	1
Falls of coal, roof, etc.,	21
Mine cars and machinery,	10
Suffocated by steam,	1
Miscellaneous underground,	8
Miscellaneous overground,	1
Total,	48

RECAPITULATION OF NON-FATAL CASUALTIES.

Explosions of (C. H.) gas,	24
Explosions of powder,	6
Explosions of oil,	3
Premature blasts,	4
Falls of coal, roof, etc.,	37
Mine cars and machinery,	31
Miscellaneous underground,	31
Miscellaneous overground,	11
Total,	147

Comparative Statement of Casualties, Tonnage, and Employees, for Seven Years, in the Third or Shamokin Division of Mining District of Schuylkill.

YEARS.	Killed.	Injured.	Total.	Total number of employés.	Number of employés to each casualty.	Total number tons of coal mined.	Number tons of coal mined to each fatal casualty.	Number tons of coal mined to each non-fatal casualt .	Ratio tons coal mined to each casualty.	Number tons of coal to each employé.
1875,	38	106	144	9,585	66.5	3,348,726	88,124	31,591.15	22,225	349.07
1876,	37	61	98	10,652	108.6	3,208,306	86,711	52,595.03	32,737.16	301.03
1877,	28	66	94	10,857	115.5	3,471,562	123,984	52,599.07	36,931.10	319.15
1878,	47	128	175	11,106	63.4	3,070,218.14	65,323.16	23,986.10	17,544.02	276.09
1879,	46	103	149	11,094	74.6	3,816,122.16	82,959.04	37,049.14	25,611.11	343.19
1880,	34	124	158	11,616	73.5	3,461,371.18	101,805.01	27,914.06	21,907.08	211.18
1881,	48	147	195	11,865	60.8	4,432,601.13	92,346	30,154	22,731	373
Total,	278	735	1,013	76,775	562.9	24,808,909.01	. . . . .	. . . . .	. . . . .	. . . .
Average,	39⅝	105	144⅝	10,968	80.4	3,544,129.16	91,607.05	36,558.14	25,812.11	310.14

NUMBER EMPLOYEES, COAL MINED, DAYS WORKED, &c., FOR YEAR ENDING DECEMBER 31, 1881.

COLLIERIES.	Operators.	NUMBER EMPLOYEES.			Number of kegs of powder used.	Number days worked.	Number mules and horses.	Number of persons killed.	Number of persons injured.	Number tons of coal shipped.
		Inside.	Outside.	Total.						
Mt. Carmel Shaft,	Philadelphia and Reading Coal and Iron Company,	282	186	468	. . .	. . .	. . .	2	4	184,358.05
Bast,	do. do. do.	118	120	238	1,160	228⅝	27	. . . .	7	91,785.04
West Brookside,	do. do. do.	486	193	679	5,800	252	121	3	15	374,533.00
Bear Valley,	do. do. do.	94	87	181	1,645	238	40	. . . .	4	73,174.13
Burnside,	do. do. do.	181	99	280	1,300	221¼	21	1	5	50,918.15
George Fales,	do. do. do.	. . .	1	1						
Helfenstein,	do. do. do.	. . .	2	2						
Keystone,	do. do. do.	68	51	119	130	127¼	6	1	4	7,726.17
Merriam,	do. do. do.	190	135	235	2,100	207	33	4	7	93,589.13
Potts,	do. do. do.	97	121	218	640	210⅝	37	. . . .	3	96,240.11
North Ashland,	do. do. do.	117	125	242	2,175	240½	34	. . .	4	119,300.08
Preston, Nos. 1 and 2,	do. do. do.	142	135	277	1,250	203⅜	45	. . . .	5	63,491.14
Preston, No. 3,	do. do. do.	153	131	284	800	239½	45	. .	5	88,576.02
Tunnel,	do. do. do.	80	56	136	375	97½	12	. . . .	. . . .	17,404.03
North Franklin, No. 2,	do. do. do.	175	125	300	2,133	235⅛	40	1	6	93,310.10
Reliance,	do. do. do.	172	139	311	3,595	240¼	31	. . . .	9	204,964.02
Locust Spring,	do. do. do.	178	105	283	2,100	238	29	. . . .	4	90,508.03
Locust Run,	do. do. do.	. .	10	10						
Big Mountain,	Patterson & Llewellyn,	340	185	525	3,909	274	80	3	8	178,959.06
Excelsior,	C. W. Kingsley & Co.,	154	91	245	3,628	274¼	39	. . . .	1	142,481.11
Enterprise,	Thomas Baumgardner & Co.,	188	92	280	3,302	259½	26	1	4	141,820.11
Locust Gap,	Graeber & Shepp,	61	116	177	1,985	242	21	1	2	86,000.00
Henry Clay,	J. Langdon & Co.,	222	100	322	2,528	293	30	3	2	114,935.03
Peerless,	Criuksnank & Ennis,	89	65	154	1,533	274	14	. . .	2	46,016.03
Sterling,	Kendrick & Co.,	161	92	253	1,997	239	20	1	. . . .	95,036.18
Royal Oak,	Tillet & Brother,	12	4	16	90	240	4	. . . .	. . . .	4,802.00
Ben Franklin,	Baumgardner & Donty,	50	50	100	500	207	21	. . .	. . . .	32,158.06
Monitor,	George W. Johns & Brother,	205	123	328	2,380	245½	30	3	. . . .	126,062.09
Cameron,	Mineral Railroad and Mining Company,	315	185	500	4,364	275½	77	1	10	175,655.16
Luke Fidler,	do. do.	228	126	334	3,221	271	59	1	7	140,291.06
Pennsylvania,	do. do.	188	127	315	3,064	267⅕	36	5	1	118,837.00
Hickory Ridge,	do. do.	31	59	90	355	227	11	. . .	. . . .	22,311.06
Short Mountain,	Short Mountain and Lykens Valley Coal Company,	501	306	807	2,232	283⅔	151	2	2	198,188.17
Williamstown,	Summit Branch Railroad Company,	538	265	803	5,197	283¾	105	4	4	279,790.01
Lancaster,	Smith & Keyser,	43	21	64	817	259¼	10	. . . .	. . . .	30,806.15

Black Diamond,	William Schwenk & Co.,	16	24	40	120	60	. . . .	1	. . . .	7,368.19
Hazel Dell,	Sykes & Jones,	36	40	76	460	168½	12	. . .	1	29,000.00
Mt. Carmel,	Montelius, Robinson & Co.,	181	132	313	3,853	235½	27	1	3	135,612.14
Big Mine Run,	J. Taylor & Co.,	234	146	380	3,970	240½	40	4	4	134,525.01
Continental,	Lehigh Valley Coal Company,	71	122	197	531	191¼	6	. . . .	2	62,506.06
Buck Ridge,	May, Audenried & Co.,	74	81	155	538	183¾	21	1	3	30,015.06
Carson,	M. E. Robinson,	47	32	79	555	196¾	5	. . . .	. . . .	14,416.02
Montana, No. 1,	Daniel Beaver,	2	2	4	2	50	. .	. . . .	. . . .	73.10
Franklin, No. 2,	S. S. Bickel,	35	40	75	242	226	12	3	2	29,917.19
Greenback,	H. J. Tondy,	78	46	124	1,035	210	14	. . . .	. . . .	30,358.08
Ransch Gap,	W. H. Yoke,	6	. . . .	6	35	. . . .	1	. . .	. . . .	1,155.00
Montana, No. 2,	A. H. Church,	63	50	113	1,695	242	11	. . . .	1	42,941.06
Pioneer,	D. Vaughn & Co.,	3	3	6	20	156½	1	. . . .	1	958.00
Bear City,	Martz & Williams,	5	4	9	88	177	2	. . . .	. . . .	2,450.00
Morris Ridge,	Isaac May & Co.,	58	62	120	889	190	7	. . . .	2	45,507.03
Logan,	Reilly, Lilley & Lentz,	130	170	300	3,627	252¾	. . . .	1	2	117,525.12
Centralia,	do. do.	72	96	168	540	61½	. . .	. . . .	1	10,662.02
Big Run Gap,	James Fennel,	10	7	17	73	213	5	. . . .	. . . .	2,628.00
		6,990	4,885	11,865	84,578	*217¾	1,419	48	147	4,181,696.17
Consumed or sold at colliery,		. . . .	. . . .	. . . .	. . . .	. . . .	. . . .	. . . .	. . . .	250,904.16
Total production,		. . . .	. . . .	. . . .	. . . .	. . . .	. . .	. . .	. . . .	4,432,601.13

* Average.

Names of Collieries in Operation in the Mining District of Schuylkill, Shamokin Division, during the seven years ending December 31, A. D. 1881.

NAMES OF THE COLLIERIES.	Location of Collieries.	Names of Operators.	COAL PRODUCED.						
			1875.	1876.	1877.	1878.	1879.	1880.	1881.
Mt. Carmel,	Alaska Station, North'd co.,	Phila. and Reading C. & I. Co.,		71.384.07	148 305.10	121.267 07	180 934 16	142.999.12	184.358 05
East,	Big Mine Run, Schuylkill co.,	do. do.		82.641.14	118 911.09	86.462 11	141 435 17	102 089 13	91.785.04
West Brookside,	Tower City, Schuylkill co.,	do. do.		172 651.15	369 573 07	282.264 00	410 815.09	308 616.04	374.533 00
Bear Valley,	Shamokin, Northumber'd co.	do. do.		55.007 06	55.632.07	75.719.04	98 417 02	53 300.07	73.174 13
Burnside,	Carbon Run, North'd co.,	do. do.		60.500 00	60.637.15	2.685.10	56.462 01	45.759 09	50.918.15
George Fales,	Shamokin, North'd co.,	do. do.		15.189.15	4 000.00	5 803.17	3 951 08	1.677.00	
Helfenstein,	Helfenstein, North'd co.,	do. do.		16 308 07	37.366.09	11 00	6.10	18 10	
Keystone,	Locust Dale,	do. do.		32.001.06	80 000 00	56.720.16	25.604.09	2 730.10	7 726 17
Merriam,	Locust Summit,	do. do.		115 326.11	136 673 10	85 500 14	64.345 19	83.098 13	93.589.13
Potts,	Locust Dale,	do. do.		39 067.05	103.806.15	81.515.14	88.493 04	77 623.03	96 240.11
North Ashland,	Dark Corner, Columbia co.,	do. do.			11 460.13	71.375.15	128 118 11	99.048 15	119.300 08
Preston, Nos. 1 and 2,	Girardsville, Schuylkill co.,	do. do.		17 525 09	27.718.02	80.584.18	93 544.12	41 437 07	63.491.14
Preston, No. 3,	do. do.	do. do.		32 217.02	98.394.03	38.610.10	91.278.12	79.356 16	88.576 02
Tunnel,	Ashland, Schuylkill co.,	do. do.		76 439 19	100 735.03	66.296.09	71.413.11	7 10	17.404 03
N. Franklin, Nos. 1 & 2	Trevorton,	do. do.		39.240 06	73.124.04	52 638.17	84.537.14	63.180 05	93.310.10
Reliance,	Mt. Carmel, North'd co.,	do. do.		32 768 14	16 359 19	7.602 17	84.866.13	81 634 07	104.964.02
Locust Spring,	Locust Gap, North'd co.,	do. do.		22 699.11	72 623.10	43.094.05	65 770.02	94.143.07	90.568.03
Locust Run,	Ashland, Schuylkill co.,	do. do.		52.973 03	80 940.00	41.450 03			
Big Mountain,	Shamokin, North'd co.,	Patterson & Llewellyn,		105.530.00	130.251.14	97 837 06	14 855.06	137.442 11	178.959.06
Excelsior,	Excelsior, North'd co.,	C. W. Kingsley & Co.,		37 933 01	42.295 05	76 011.10	67.195 10	104 308.09	142.481.11
Enterprise,	do. do.	Thomas Baumgardner & Co.,		72.550.17	72.743.18	67 886.10	110.581 03	79 017 08	141.820.11
Locust Gap,	Locust Gap, North'd co.,	Greaber & Shepp,		52.371.16	76.000 00	68.344 18	86.068 05	92.401 18	86.000.00
Henry Clay,	Shamokin, North'd co.,	J. Langdon & Co.,		83.374.14	81 169 04	9.998 01	137.188 07	109.691.03	114.955.03
Peerless,	do. do.	Cruikshank & Ennis,			12 087.07	33.499.15	23.638 10	29 231.11	46.016.03
Sterling,	Carbon Run, North'd co.,	Kendrick & Co.,		20.319.12	103.044.01	54.085.14	76.545 14	80.930 15	95 036.18
Royal Oak,	Shamokin, North'd co.,	Tillet & Brother,		700.00	302 02	295 00	392.10	2.197.01	4.802.00
Ben Franklin,	Douleyville, North'd co.,	Baumgardner & Douty,		31 145.01	21.334 00	38.622 03	51 604 13	38 411.16	32.158.06
Monitor,	Locust Gap, North'd co.,	George W. Johns & Brother,		81 620.00	131 110.13	95.126 13	110.429 03	119 942.13	126.062.09
Cameron,	Shamokin, North'd co.,	Mineral Railroad & Mining Co.,		178.662 16	166.047 00	160.194.00	161.403 19	160 853.13	175.655.16
Luke Fidler,	do. do.	do. do.		100.544.11	119.576 15	103.964.16	114 654.06	118.643 03	140.291.06
Short Mountain,	Wiconisco, Dauphin co.,	Lykens Valley & Short Mountain Co.,		151.093.08		112 095 09	194 784.00	171.417.05	198.188 17
Williamstown,	Williamstown, Dauphin co.,	Summit Branch Coal Co.,		239 768 04	263 674.02	237.239 12	259.889.10	227.169.06	279.790 01
Lancaster,	Coal Run, North'd co.,	Smyth & Keyser,		16.146.00	6.964 08	8.697.03	13.986 13	14 883.14	30.806.15
Black Diamond,	Mt. Carmel, North'd co.,	William Schwenk & Co.,		35 207.02	23.713.09	19.616.11	13.022 14	26.125 15	7 368 19
Hazel Dell,	Centralia, Columbia co.,	Sykes and Jones,						16 270 06	29.000.00
Mt. Carmel,	Mt. Carmel, North'd co.,	Montelius, Robinson & Co.,		60 042.12	74,000.17	80 418.15	55,106 16	53 000 00	135.612 14
Big Mine Run,	Big Mine Run, North'd co.,	Jeremiah Taylor & Co.,			19 000 00	48.715 06	63 303 18	111.683 12	134.525.01
Continental,	Centralia, Columbia co.,	Lehigh Valley Coal Co.,			25.228 13	53 857 17	107.663 00	79.598 00	62 506.06
Buck Ridge,	Shamokin, North'd co.,	May, Audenried & Co.,		55 182.00	43 560.12	46 198 02	77.560 00	53 768 05	30 015 06
Glen City,	Glen City, Columbia co.,	J. A. Losee,		17,454 06	14,784.14	22 430.15	26 762 04	11,128.18	

Carson,	Shamokin, North'd co.,	Philip Goodwill,				1,430 00	5 185 00	11,460.02	14 416.02
Montana,	Montana, Columbia co.,	Miller, Rupp & Weaver,				68.15	118.05		
Pennsylvania,	Green Ridge, North'd co.,	Mineral Railroad & Mining Co.,					17,102.04	105 882.13	118 837.00
Franklin, No. 2,	Barry twp., Schuylkill co.,	S. S. Bickel,				9 000.00	14,085.00	8 966.00	29 917.19
Greenback,	Greenback, North'd co.,	H. J. Toudy,	23 917.04			7,132 12	16 567.08	25,885 03	30 358.08
Brentzill,	Rocktown, Schuylkill co.,	Philip Brentzill,					75 00		
Rauch Gap,	Valley View, Schuylkill co.,	W. H. Yohe,				453.10	986.00	896.17	1,195 00
Montana, No. 2,	Montana, Columbia co.,	A. H. Church,					10,345.18	11,276.19	42 941 06
Pioneer,		David Vaughn & Co.,						2,373 00	958.00
Shamokin,		George Tibbetts & Co.,						2 197.01	
No Name,		Samuel Meyers,						70.00	
Centralia,	Centralia, Columbia co.,	Rielly, Lilley & Lentz,	38,207.19	62,976.00	62,133.10	37,805.00			10,662 02
Hazel Dell,	do. do.	George Troutman,	29,384 00	45,420.00	6,835 00	13,193 00			
Lilly,	do. do.	do.			7,711.00	2 774.00			
Big Run Gap,	Williams Valley, Dauphin co.	James Fennel,		2,008.05	1,794 00	2,703 10	2,568 00		2,628.00
Glenn,	Centralia, Columbia co.,	Bryson McBriarty,			3 000.00	2,000.00			
Kline,	Montana, Columbia co.,	J. L. Kline,			259.15	239.00			
Big Mountain, No. 2,	Mt. Carmel, North'd co.,	Northumberland Coal Co.,	1 000.00		592.05		200.00		
Vaughn,	Ashland, Schuylkill co.,	D. Vaughn & Co.,	1,482.00		1,532.00	3,858.00	2,373.00		
Little Mine Run,	Centralia, Columbia co.,	Piffer & Geraghty,			9.10	23.00			
Gensil,	do. do.	Pulaski Gensil,			245.10	32.00			
Ashland Estate,		A. Bancroft,	987.16			156 00	24 10		
Bear City,		Martz & Williams,				150.00	413 00		2,450.00
Germantown,		E. H. Herb,				167 00			
West Hazel Dell,	Rocktown, Schuylkill co.,	William Piffer,			202.00	117.00			
Centralia Outcrop,	Centralia, Columbia co.,	James Sykes,				19 00			
Little Diamond,		Donahoe & Curran,				156 00			
Packer,	Mt. Carmel, North'd co.,	D. J. Lewis,		1,250 05	5,000.00	370.08			
Hickory Ridge,	Hickory Ridge, North'd co.,	Mineral and Mining Company,	9,622.17	23 241.04	21,520.02				22,311.06
Big Lick,	Dayton,	Summit Branch Railroad Co.,	1,482.05	52,001.12					
Big Run Gap,	Big Run Gap, North'd co.,	do. do.	3.000.00						
Hickory Swamp,	Shamokin, North'd co.,	Mineral Railroad & Mining Co.,	30 872.04						
West Lehigh,	Glen City,	F. L. Shuman,	18,000.00	2 080.12					
North Side,	Lykens Valley,	Ed. Miller,		2,080 42					
Marshall,	Red Ash,	George Roup,		971.16					
Franklin,		A. A. Heim,	4 253.07	3,844.06	3 528 07	2,172.02			
Montana, No. 1,	Centralia, Columbia co.,	Daniel Beaver,						330.07	73.10
Morris Ridge,		Isaac May & Co.,							45,507.03
Total shipped to market,				2 588 005.17	3 229.357.00	2 816 747.14	3,720.603 16	3,285 216.15	4 181,696.17
Consumed or sold at colliery,				151,971.04	242,205.00	253,471.00	95 519.00	176,155.03	250,904.16
Total production,			3,348,726	2 739 977.01	3,471,562 00	3,070,218.14	3,816,122.16	3 461,371.18	4 432,601.13

LUZERNE AND CARBON COUNTIES.

MIDDLE DISTRICT.

OFFICE OF INSPECTOR OF COAL MINES,
WILKES-BARRE, PA., *March 23, 1882.*

To His Excellency HENRY M. HOYT,
Governor of Pennsylvania :

SIR: In compliance with the act entitled "An act to provide for the health and safety of persons employed in coal mines." I have the honor of presenting herewith my second annual report of the inspection of coal mines in the middle or Wilkes-Barre district, for the year ending December 31, 1881. It contains the usual tables enumerating the fatal accidents and also the serious accidents which did not prove fatal; the amount of coal mined at each colliery; the number of days in operations at each breaker, and the number of each class of employés, together with other useful statistics and brief notes of information on several topics connected with the mines.

The total number of accidents was two hundred and forty-nine, out of which seventy-nine resulted fatally; leaving thirty-eight widows and one hundred and ten orphans; but many of the latter were old enough to care for themselves.

The total amount of coal mined during 1881 is 7,021,508.40 tons; being an excess over the amount mined during 1880 of 1,312,694.85 tons.

The amount of coal mined per life lost is 88,879.85 tons; against a production of 111,937.52 tons per life lost during 1880.

The total number of persons employed in preparing and mining coal average 16,808, and besides these there were about three hundred persons employed driving tunnels and sinking shafts, adding which would make the total number employed equal 17,108 persons.

About three fourths of the collieries of this district are now generating more or less explosive gas; and the danger and necessity of vigilant care to avoid accidents are proportionately increasing as the mines approach the deeper basins, making it incumbent upon the men having charge of coal

mines, to prepare themselves so as to be enabled to contend successfully with any emergency that may arise from this or other unexpected sources, and keeping themselves informed in the causes of accidents at other mines, so as to be prepared when the occasion arises to prevent like ones happening in theirs. I regret to state that some serious accidents have occurred, which, evidently, could have been foreseen and prevented by men of ordinary intelligence, if the cause of accidents in other collieries, and in similar situations, had been properly studied. Men who do not take pains to learn, and profit from the experience of others are not fitted to have charge of the coal mines of these days; and for the benefit of those who will, a brief description of all the fatal accidents is set forth in this report,

Very respectfully submitted,

G. M. WILLIAMS,
Inspector of Coal Mines.

Total Amount of Coal Mined during the year 1881.

	Tons.
Lehigh Valley Coal Company,	691,902.15
Lehigh and Wilkes-Barre Coal Company,	1,894,642.68
Delaware and Hudson Canal Company,	1,381,109.77
Susquehanna Coal Company,	852,676.85
Miscellaneous coal companies,	2,201,176.95
Total of all coal companies,	7,021,508.40

Number of Fatal Accidents, and Amount of Coal produced per Life lost.

Names of the Companies.	Killed.	Coal mined per life lost—tons.
Lehigh Valley Coal Company,	10	69,190.21
Lehigh and Wilkes-Barre Coal Company,	26	72,870.87
Delaware and Hudson Canal Company,	13	106,239.21
Susquehanna Coal Company,	12	71,056.40
Miscellaneous coal companies,	18	122,287.60
All coal companies,	79	88,879.85

Number of Employees, and Tons of Coal Mined per Person Employed.

Names of the Companies.	Number of persons employed.	Coal mined per employé—ton.
Lehigh Valley Coal Company,	1,550	446.38
Lehigh and Wilkes-Barre Coal Company,	4,941	383.65
Delaware and Hudson Canal Company,	2,699	515.41
Susquehanna Coal Company,	2,341	364.23
Miscellaneous coal companies,	5,277	417.12
All coal companies,	16,808	417.74

Average number of days worked, and Tons of Coal Mined per day for Each Person Employed.

NAMES OF THE COMPANIES.	Days worked.	Tons mined per employé.
Lehigh Valley Coal Company,	214.65	2.08
Lehigh and Wilkes-Barre Coal Company,	221.84	1.72
Delaware and Hudson Coal Company,	216.15	2.38
Susquehanna Coal Company,	246.57	1.47
Miscellaneous coal companies,	208.70	1.99
All coal companies,	221.58	1.88

Classification of Fatal Accidents for 1881.

CAUSES OF ACCIDENTS.	Number.	Per centum.
By explosion of gas,	10	12.655
By falls of roof and coal,	28	35.44
By falling down shafts,	3	3.80
By cars underground,	10	12.65
By explosions of powder and blasts,	7	8.86
Miscellaneous causes—inside,	3	3.80
Miscellaneous causes—outside,	18	22.795
Total,	79	100.00

Number of widows, thirty-eight; orphans, one hundred and ten.

Accidents not proving Fatal.

CAUSES OF ACCIDENTS.	Number.	Per centum.
By explosion of gas,	24	14.12
By falls of roof and coal,	43	25.29
By falling down shafts,	1	.59
By cars underground,	44	25.88
By explosions of powder and blasts,	25	17.71
Miscellaneous causes—inside,	16	9.41
Miscellaneous causes—outside,	17	10.00
Total,	170	100.00

Present Condition of the Mines.

While nothing of special importance has occurred during the past year to vary the conditions of the collieries of this district, the spirit of improvement is actively at work developing the coal beds in new localities, and improving the system of mining and preparing coal. New complications frequently arise as the gaseous mines advance into the solid strata, requiring the officials to be attentively watching, fully prepared to subdue the manifold difficulties which are always arising when anything unusual occurs affecting the safety of the mines. More attention is evidently given latterly to the various questions concerning the most approved methods of

working gaseous coal seams, with a view of diminishing the perilous risks of the workmen, and insure the highest degree of safety for them and the property. It is evident that keener aspirations to acquire more extended knowledge of improved methods of mining coal are cultivated among many of those men who have direct charge of the mines, and the time is rapidly approaching when none but the most intelligent men can possibly prove successful in that capacity, for the dangers to life and property are increasing as the collieries are extended towards the deeper basins, so that more skill is required to contend with them and manage the mines with safety and profit.

Ventilation.

Adequate quantity of ventilation is generally recognized to be the initial principle of safety in coal mines, and the most important in its bearings upon the various causes of danger. The lives of thousands of workmen in these mines depend on the unbroken stream of air which flows through the face of the workings, and, in many cases, a short interval of interruption would, in all probability, be attended with disastrous results. It is, therefore, a vital duty incumbent on all mine bosses to study the effects of their ventilation in all its bearings, use it to the best advantage, watch it perpetually, and to insist on their fire bosses and assistants to exercise the same assiduous care at all times.

Perusal of table No. 10 in this report, which shows the quantity of air, number of splits, and number of persons employed in each split, shows the condition of the ventilation of each mine in its most favorable aspect. The vacuum pressure is not given, because, the mine bosses says, they have no water-gauges to measure it with. The proprietors ought to have furnished one for each colliery, for it is certainly a very useful instrument, and with it the power expended upon the friction of air in passing through the mine could at all times be conveniently ascertained.

Doubtless, in those mines where the ventilation is confined to one or two splits, having long distances to travel, and requiring high water-gauges, compared to the quantity of air circulating through the workings, a division of the air-currents into a greater number of splits would most certainly effect a distinct increase in the aggregate quantity of ventilation obtained, besides enhancing the sanitary condition of the mine. This is not always practicable, but in most cases it could be done by wisely expending little money to that effect.

In other mines, particular attention is required to effect compliance with the law respecting the number of persons employed to work in each split. To employ more than fifty in each split is not lawful in mines where fire-damp is found. It is difficult to keep within this bound at all times in large mines, but, in most cases, the difficulties can be subdued by little effort in that direction. In other cases, particular attention to a proper distribution of the workmen into the various splits proportionately as the quantity of air circulating in each, would produce good results and pleasing effects

upon the men. These points are frequently impressed upon the bosses, and they generally respond with a cheerful effort to produce the desired changes, whenever the conditions are found to be at variance with the law.

Mine Doors.

My efforts were directed against a too general custom of using canvass cloth for doors at important points in the mines, for they are looked upon as temporary affairs, not of much importance, and are, therefore, unreliable, and very frequently subject to gross neglect. It is agreeable to note that they have now been almost entirely excluded, except as temporary expedients, to serve at points where wooden doors cannot be immediately or safely constructed, and the foremen who, at first very reluctantly consented to discard them, are awakening to the fact that good substantial wooden doors are safer, more reliable, cheaper, and more strictly in accordance with the law than were the frail, inflammable canvas ones, which were formerly used, and which invariably were put up crudely and very imperfectly. The wooden doors are also too frequently found in a deranged condition, and in some collieries very crudely and carelessly constructed. As a rule the construction of the doors is found to be in harmony with that of other things through the mine. Well-constructed mine doors are generally co-existent with good order, efficient discipline, and active disposition to conform with the letter and spirit of the law, and on the other hand, the indifference of a boss to even minor matters seems to act contagiously, and breeds carelessness and lack of interest at all points in the colliery where such prevail.

Propping.

Of all the branches under the control of mining bosses, the propping, perhaps, is the most difficult to deal with successfully. Recognizing this fact, the companies have adopted different systems to accomplish the work. Each system has some degree of merit as well as demerit, and each is attended with disagreeable features for the one in charge. There are three of them in vogue in this district, which are described as follows:

(1.) Where the miner put the props up, and is paid a specified extra price for each, adjusted according to its length and thickness, but he must be guided by the bosses as to the number and place where they might be required. Moreover, in the absence of the boss, he is not only permitted, but enjoined to put up props rather than work in danger. With this system, there is no trouble experienced to have enough props put up to secure the working places, for the extra compensation offered is sufficient inducement to insure the work. The bosses complain, perhaps with good reason, that many props are put up which are not really necessary, and they dread to assume the responsibility of removing them, or to stop the miners from putting them where they say they are needed, fearing an accident may possibly happen in consequence thereof.

(2.) Where the companies assume all the responsibility, and keep gangs

of men to put up all the necessary props and timbering throughout the mine. When a miner needs a prop where this system is in vogue, he sends for the prop-men to put one up for him. This system evidently originated, and remains in practice only, in thick seams where the props required are from eighteen to twenty-two feet long, and requiring four or five men to put one up. This plan insures good propping, with a minimum waste of timber, but it is subject to grave objections, and liable to expose the miner to great danger, because the prop-men cannot always respond promptly enough to the call when a prop is wanted, and they are frequently wanted in two or more places at once. Consequently, some have to work for hours exposed to danger before the prop-men are able to go and secure it for them. In some of the mines where this system is adopted, the propping is done at night, and, if any danger arises during the daytime, and props needed, the party who work at that point are stopped until the place is secured. This, also, is attended with danger from the fact that men will not stop if any loss is entailed by doing so. We are well aware that hundreds of miners will very readily expose themselves to danger rather than loose even the price of a car of coal. Therefore, the bad feature of this system is that it leaves open to the miners this possible cause of exposing themselves to danger and foolish risks; yet, where this system has been the customary one for years, the miners themselves have not been trained nor accustomed to stand props, and I am not prepared to say it would be prudent nor safe to change it.

(3.) With this system the miner has to put up all the props necessary to secure his working place against danger without any compensation, but that of his own safety; the company claiming they pay higher price for mining the coal, so as to include the propping, only they, the company, furnish the timber required at the mines. The trouble entailed by this system arise from the fact that so many careless men are employed in the mines who will neglect to procure props and secure their working places when there is no other inducement offered than the safety of their own lives; consequently, the mining bosses have to keep vigilant watch over this class of miners, and are often compelled to use harsh means in order to effect a tolerable degree of security for them and their laborers.

I am not prepared to say which of the above three modes of doing the propping work is best, but I am inclined to believe the first insures the highest degree of safety to the workmen. The pecuniary consideration offered for standing props banishes all excuses for neglect, besides being additional inducement to put up sufficient number to make the working places certainly safe. There is one thing connected with this subject which ought to receive the consideration of the operators of all mines, *i. e.* the props ought to be furnished to the miner, already cut into proper length, by a party detailed for that special work. It is injurious to a man's health after working hard in the moist atmosphere of a mine, to cut props outside in all kinds of weather, and it is well known that propping is frequently de-

layed because a miner is too tired, or the weather too disagreeable or cold for him to cut the needed props into proper lengths. If the props were furnished already cut to the required lengths, the dangers arising from the latter cause would be averted.

The Dangers of Inflammable Structures over the Top of Inlets.

Since the enactment of the mine ventilation act, providing second openings for coal mines, people entertain the opinion that, in case the structure built over the top of shafts should get on fire, the workmen would have a safe escape through the second opening, and that another disaster similar to the Avondale calamity, in 1869, is impossible. But those persons who are familiar and conversant with the mines and the facts pertaining to this subject, cannot, with any confidence, entertain such an opinion, for all who realize the situation perceive that the second openings are invariably too remote from the workmen to be easily accessible in case of fire. There are at least fifteen collieries in this district where it is extremely doubtful that any of the workingmen could escape, if fire should originate around the top of the shaft, as it did when the Avondale disaster occurred. It is evident when we consider that in every instance the air currents are entering the mines through the shafts, over which these inflammable structures are erected, and at a velocity of from four to six hundred feet per minute, a speed at which the men would be enveloped in dense deathly smoke quicker than the fleetest messengers could arrive and give alarm. Thus the probability is that a large number of the men would be suffocated before they could reach the second opening, in case of fire originating at the point stated.

It has been demonstrated many times that wood smoke will very quickly cause a man's death. In most of the mines alluded to the men have many thousands of feet distance to travel to the second openings, and more or less part of which, unavoidably, through the intake roads, where the smoke would be first encountered. Another serious disadvantage is that very few of the employés in the mines know the way to the second openings, or exhibit any desire to acquaint themselves with it, so as to be prepared to escape in cases of emergency. If fire should occur, as described, we conceive the situation would be terrible. Imagine the scene where two or three hundred persons, at divers points in a coal mine, thousands of feet away from the single chance of escaping death, striving, groping their way through dense smoky atmosphere, in utterly dark passages, and not knowing the road leading to the only chance of refuge. Indeed the chances of escape would be very cheerless and distracting, and we hope such a scene will never need be realized.

Some persons may suggest the fan could be stopped, and consequently the air current would probably be reverted by the heat of the fire; but in the gasy mines this would not do, because another element of destruction would thus be produced, adding new complications, from which disastrous results could not be avoided. If the ventilation was stopped for fifteen or

twenty minutes in some of the mines, enough fire-damp would accumulate to produce an explosion much more destructive in its effects than the smoke. And, in the excitement, some one would forget a lighted lamp or leave something burning and cause an explosion.

It is evident that generally the fans must not be stopped. The only feasible plan to avert such calamities, is to permit no inflammable structures on top of openings where the ventilation is entering the mines, so the intake shafts would be always safe from fire, and available for the exit of the men.

The Lehigh Valley Coal Company have erected their breakers some distance away from the intake openings, and have iron structures sustaining the pully wheels over the shafts, which are absolutely safe so far as fire is concerned.

After deliberate study of this matter, I am decidedly convinced that the law ought to be amended so as to prohibit the erection of any more wooden structures over the intake openings, and thereby preclude the possibility of grave calamities from this source.

Fires in the Mines.

If explosives could be discovered, having the peculiar properties of common blasting powder, but producing no flame during explosion, it would be highly valuable in the operation of extracting coal where very strong gas blowers prevail. The great trouble and perplexing difficulties experienced from fires resulting from the blasts in fiery gangways could then be averted. The face of these gangways are now very frequently the seat of raging fires, caused by the blowers taking fire from the blasts. And to be always prepared to extinguish them, water-pipes are laid all the way into the mine along each gangway, measuring from two to two and a half inches in diameter, accompanied with hose and other necessary implements; and when the blowers ignite, after waiting a few moments for the coal to heat nearly red hot, the water is applied; which, being converted instantly into steam, cuts off the air, and extinguishes the fire. The gases produced by these fires are exceedingly annoying and injurious to the persons breathing the air vitiated by them. And fires of this kind, when occurring frequently, present a serious question to the managers concerning the safety of the colliery, as well as the men employed in it.

In the month of May, 1889, Mr. William T. Smyth, general foreman for Charles Parrish & Co., experimented upon the use of dynamite for blasting coal in the Hollenback mine, with a view of averting these difficulties, and found that it did not ignite the gas blowers so readily as powder. Since then, they frequently use this exlosive at points where much trouble is experienced from free effusion of gas, and have but very seldom experienced any difficuly from the ignition of blowers.

The dynamite is invariably exploded by electricity. Is more expensive than powder, and destroys more of the coal. The men complain of inju-

rious effects produced upon them from inhaling its fumes, unless the quantity of air passing is sufficiently large to carry that away quickly. It proves a valuable expedient to work places which are almost impossible of driving with common blasting powder, owing to the presence of unusually strong blowers of gas, and only under those circumstances can it be recommended for use in blasting coal.

The timber was discovered on fire in an air-way, near the pump, in the Lance colliery, Lehigh and Wilkes-Barre Coal Company, May 14, and it burned furiously for several hundred feet along the gangway. The roof fell to a height of about ten feet, and complicated the situation to an alarming extent. They succeeded, by strenuous efforts, and the application of plenty of water, to check it in a day or two, and finally extinguished it by that means, in the course of three weeks.

The origin of this fire could not be ascertained, but it started at a point where the steam pipe had dried everything to tinder, and where the heat was intense, and it probably ignited spontaneously.

RECORD OF COLLIERY IMPROVEMENTS FOR 1881.

Lehigh Valley Coal Company.

At the Henry shaft, compressed air was introduced to supersede steam, for the purpose of working the underground machinery. The heat radiating from the steam pipe underground, raised the temperature of the ventilation to a degree so as to cause serious disadvantage to the workmen and operators, in several ways; and to repair this, compressed air was tried, and the change proved very agreeable to all concerned.

The compressing engine is located near the boilers, at the top of the shaft, and the compressed air conducted underground through the pipe formerly used to convey steam. A description of the compressors, and the benefits resulting from the change, is given in the following letter, addressed to the writer, from Mr. Lines, outside foreman:

HENRY COLLIERY, *August 6, 1881.*

G. M. WILLIAMS, Esquire:

SIR: I give you herewith the results thus far obtained from using compressed air in our inside workings. Our compressor is a "Duplex;" size, fourteen inches to seventeen inches; stroke, thirty-six inches; with a boiler pressure of sixty-five pounds. We get an average piston speed of three hundred feet on compressor, and an air pressure of forty-eight pounds on receiver. It is running four direct acting pumps; size, lifts, &c., as follows: One pump, twenty inches; diameter of cylinder, twenty inches; length of stroke, twenty-four inches; piston speed, eighty feet per minute; discharge of water, one hundred and sixty gallons; vertical height of lift, two hundred feet.

One pump, ten inches, diameter of cylinder; twelve inch stroke; piston speed, sixty feet per minute; discharging sixty gallons of water; a vertical height of seventy-three feet.

One pump, ten inches, diameter of cylinder; twelve inch stroke; piston speed, forty feet per minute; discharging fifty gallons water; one hundred and five feet, vertical height.

One pump, ten inches, diameter of cylinder; twelve inch stroke; piston speed sixty-four feet per minute; discharging eighty gallons of water; eighty-one feet, vertical height.

We do our pumping at night, lifting about seven hundred tons of water to foot of shaft. The ventilation of our lower levels is greatly improved; the temperature normal; and the total quantity increased.

We hoist the coal from our lower (No. 2) slope, with air; it does the work nicely, far better than steam, owing to the great condensation of the latter; the pipes leading to engine being somewhere over a mile in length.

In summing up the advantages of compressed air over steam, I find that, when the pipes leading the steam are longest, there we have the best results with air. Take our lower pump as an illustration, we have somewhere about six thousand one hundred feet of pipe leading to it. With steam pressure of sixty pounds on boilers, we could get only twenty-eight feet per minute of piston speed. Now, with air pressure of forty-eight pounds, we can get a piston speed of sixty feet. The ratio of gain is less as we approach the boilers. The temperature of the air exhausting from the pump into the air currents is about thirty-five degrees Fahrenheit.

My impressions are that for deep workings compressed air is a grand success. There is necessarily a small loss by condensation in long pipes when steam is used, and, besides, the pressure with air is effective at all points.

I have written this for your information, at your request, and trust it may embody all you expected.

Yours respectfully,

William E. Lines.

This company is sinking a new shaft called Dorrance, on the Bidlack farm, near Wilkes-Barre, the sectional area of which is fifty-two by twelve feet, and it is expected to cut the Baltimore seam at a depth of one thousand feet. When completed, it will have two distinct hoisting departments, one for the Hillman, and the other for the Baltimore seam. There are twenty-five men employed in it, and at the time of this writing, December 31, it is down two hundred and fifty feet. Several years will elapse before it will be completed ready to ship coal.

Lehigh and Wilkes-Barre Coal Company.

At the Empire shaft a tunnel was driven from the Baltimore vein to the Red Ash. It is one thousand and twenty feet in length, and has a sectional area of seven by fourteen feet. The coal is fourteen feet thick, and of good quality.

At the Hartford slope a new tunnel was driven from the Baltimore to the Ross seam, the area of which is seven by twelve feet, and is five hundred

feet in length. A second opening is effected to another lift, and the coal is twenty feet thick, and of good quality.

At No. 9 shaft, Sugar Notch, two tunnels are now in progress of driving from the Ross to the Red Ash seam, having an area of twelve by seven feet.

The Lance shaft was extended from the Bennett down to the Baltimore seam. The depth of extension was two hundred and thirty-three feet, and the total depth of the shaft, at present, is five hundred and fifty-nine feet from the surface. An air shaft is in progress of sinking, which will constitute a second opening for the other. It was down, December 31, 1881, three hundred and thirty-five feet, and, when completed, will probably be five hundred and thirty feet. There was no coal shipped from this colliery during 1881, but it will be ready to ship coal in the course of a few months, when the second opening will be effected. They have been employing an average of sixty-three persons during the year, effecting the work described.

The Stanton air shaft was down December 31, a depth of six hundred and eight feet and is to be extended to the Baltimore seam; a probable depth of eight hundred and thirty feet. This shaft is intended to improve the ventilation of the Audenreid colliery, and a fan, thirty-five feet diameter, will be erected upon it for that purpose. The shaft is twelve by twenty-five feet; part of it will probably be used to work the Hillman seam, the condition of which appears favorable for that in the shaft. They are employing an average of twenty-five persons and had two fatal accidents during the year just past.

The south Wilkes-Barre shaft was down, December 31, a depth of five hundred and eighty-six feet, and when completed to the Baltimore seam will be about one thousand one hundred feet deep. Its size is twelve by twenty-four feet, and is employing an average of twenty-one persons.

Delaware and Hudson Canal Company.

At the Mill Creek slope a new tunnel was driven from the lower to the upper split of the Baltimore seam. It is two hundred and eighteen feet in length, and has an area of seven by twelve feet. The seam is eight feet thick, and the coal is of good quality.

A new pair of hoisting engines was erected at the top of the slope to supersede the old ones. The dimensions of the steam cylinders are twenty-six by forty-eight inches, and the drum is twelve feet diameter.

At Laurel run slope a new tunnel was driven from the bottom to top split of the Baltimore seam, a distance of sixty-feet; seven by ten feet area, and has opened a convenient territory of coal.

The new tunnel in the Baltimore Tunnel colliery, noted in my last report, is completed, and the second opening effected. It is one thousand four hundred and fifty feet in length, and seven by fifteen feet area. The Baltimore seam in this colliery is very nearly exhausted, and this tunnel was driven from that seam to the Red Ash, of which they have a very large territory intact. The coal is of good quality, and fourteen feet thick. A

new double fan was erected to supersede their old furnace. The fans are seventeen and a half feet in diameter, and fastened on the same axis, about eight feet apart; a plan of which is kindly furnished for this report, which can be seen in connection with the report of tests of the fan.

The breaker formerly at Young's slope was removed and erected at the Conyngham shaft. It was completed by August 13, when they began shipping coal. When the colliery is fully opened they will be able to put out about seven hundred tons of coal per day. About twelve years have elapsed since ground was first broken to sink this shaft.

Susquehanna Coal Company.

A tunnel was driven in No. 1 slope, from the Red Ash seam to the Ross. Its length is four hundred and eighty-seven feet, and size seven by ten feet. The coal is thin, but of good quality. Another tunnel is in progress lower down on the dip, in No. 2 shaft, to cut the same vein. A slope is also in progress of sinking in this shaft, towards the basin. It is down, at this writing, four hundred and eighty feet from the gangway level, near the bottom of the shaft, on a varying grade of from seven to twelve degrees.

Kingston Coal Company.

This company's new shaft, at Kingston, is down to the Red Ash vein, and has cut, in all, five seams of good workable coal. The Red Ash, at the point cut, is six feet thick. A tunnel was driven in No. 1 shaft, from the Cooper to the Bennett seam, which is ten feet thick, and has opened a convenient section of coal of good quality. The tunnel is two hundred feet in length.

Gaylord Coal Company.

The Gaylord shaft is completed to the Red Ash vein, and has cut three veins hitherto not worked in this track, viz: Bennett, Ross, and Red Ash seams. They are now working to effect second openings, which will be accomplished in about three months. The shaft is forty-seven by twelve feet area, and five hundred and seventy-five feet in depth. There are two pairs of hoisting engines and four cages—all of the latest and most approved plans. The coal will be shipped through the old Gaylord breaker, and will eventually be able to ship about twelve hundred tons per day.

Franklin Coal Company.

In the Brown slope a new tunnel was driven from the Baltimore to the Red Ash vein, and a new plane was made in the former to let the coal down from the upper lifts.

W. G. Payne & Co.

In the East Boston mine a new tunnel was driven from the Bennett to the Cooper vein, which is one hundred and fifty feet in length, and fourteen by six feet area. The seam is six feet thick, and the coal of excellent quality.

Albright Coal Company.

A tunnel was driven from the surface through the Ross and Red Ash seams, through which the coal from those veins will be hauled to the breaker. It is one thousand feet in length and seven by nine feet in size. The veins are thin but of good quality. The shaft workings were abandoned and allowed to fill with water.

Red Ash Coal Company.

At this promising colliery a tunnel was effected from the surface to the Red Ash, and has cut the Six-Foot and Ross seams besides the former. The tunnel is six hundred and twenty-four feet in length, and the coal aggregate a thickness of twenty-four and a half feet of excellent quality. A new breaker is in course of construction which will enable this company to double their shipments for the year 1882.

New Shaft.

There are in all eleven new shafts in various stages of progress in this district, three of which have reached their terminus. A description and details relative to these shafts is given in Table No. 1, to which the reader is referred.

TABLE No. 1.—*Giving details relative to the progress of new shafts in the Wilkes-Barre District, and their depth, December 31, 1881.*

NAMES OF THE SHAFTS.	Names of Operators.	Purposes.	SIZE.		Depth on December 31, 1881.	Number of men employed.	Deepest coal seam to be cut at present.	Probable depth in feet.	Capacity of production per day in tons.	Fatal accidents to employees.	Non-fatal accidents to employees.
			Length in ft.	Breadth in ft.							
1. Dorrance,	Lehigh Valley Coal Company,	Hoisting coal,	52	13	250 ft.	25	Baltimore,	1 000	1,000		
2. South Wilkes-Barre	Lehigh and Wilkes-Barre Coal Company,	Hoisting coal,	24	12	586	21	Baltimore,	1 100			
3. Stanton Air Shaft,	Lehigh and Wilkes-Barre Coal Company,	Hoisting and ventilating,	26	12	680	25	Baltimore,	850		2	1
4. Lance Air Shaft,	Lehigh and Wilkes-Barre Coal Company,	Ventilation,	18	10	335	63	Baltimore,	530			
5. Extension of Lance Shaft,	Lehigh and Wilkes-Barre Coal Company,	Hoisting coal,	28	12	559		Baltimore,	559	800		
6. Woodward,	Del're, Lackawanna, and Western Coal Co.,	Hoisting coal,	53	10	30	30	Red Ash,	800	1,000		1
7. Alden,	Alden Coal Company,	Hoisting coal,	26	12	28	18	Baltimore,	270	1,000		
8. Bennett Shaft,	Thomas Waddell & Co.,	Hoisting coal,	20	10	290	37	Baltimore,	310	1,000	2	
9. No. 3 Shaft, Kingston,	Kingston Coal Company,	Hoisting coal,	33	12	544	22	Red Ash,	544	800		
10. Gaylord Shaft,	Gaylord Coal Company,	Hoisting coal,	47	12	575	20	Red Ash,	575	1,000		
11. Raubville Shaft,	Waddell & Walters,	Hoisting coal,	22	12	192	21	Bennett,	192	600		

New Fans erected during 1881.

It is now generally conceded that the fan is more efficient than the furnace for ventilating shallow mines, and the latter is rapidly disappearing from use, and will soon be a thing of the past in this district. To supersede the furnace at the Baltimore tunnel, the Delaware and Hudson Canal Company erected a new double fan, designed by their superintendent, Mr. C. H. Scharar, and it has proven a surprising success and is producing unusually large volume of ventilation. A report of tests made of the efficiency of this fan is furnished for this report, and is found elsewhere under that heading.

To supersede their old furnace which failed to supply sufficient quantity of air, a new twelve foot fan, open periphery, was built, on the plan generally adopted by the Delaware, Lackawanna and Western Company, at their Boston mines, which has improved the ventilation of the mine so that the men can work without experiencing any discomfort.

At the Albright colliery a fan was erected over their new tunnel, and is supplying sufficient ventilation for their colliery. Dimensions of these fans is given in Table No. 2, but I have not been able to get the quantity of air exhausted by the latter.

TABLE No. 2.—*Giving details relative to new fans and fan engines, erected during the year 1881, in the Wilkes-Barre District.*

NAMES OF COLLIERIES.	Pattern of fan.	DIMENSIONS.		SIDE INLETS.		Working speed in revolutions per minute.	SECTION'L AREA OF		Cubic feet of air per minute exhausted.	Water guage on fan side.	Horse-power of fan.	FAN ENGINES.	DIMENSIONS OF STEAM CYLINDER.		Gearing.	Steam pressure in pounds.	Horse-power of engine.
		Diameter of fan in inches.	Face of fan in feet.	Number of inlets.	Diameter of inlets.		Upcast in square feet.	Downcast in sq. feet.				Horizontal or vertical.	Diameter in inches.	Length in inches.			
Boston, ...	Open periphery, . .	12	3.6	2	6′	116	72	216	64,570	7″	7.12	Horizontal, ...	12	18	Belt,	70	18
Baltimore tunnel, ...	Scharar double fan,	17.5	4	4	8′	50	107	. . .	147,132	5″	11.60	Horizontal double. .	14	28	Belt,	30	28
Albright colliery, ...	Closed, ...	20	5	2	10′	32	63	63	. . . . .	. . .	. .	Horizontal, ...	. . . .	. . . .	Direct	45	40

Tests made with the New Fan at the Baltimore Tunnel Colliery, Delaware and Hudson Canal Company.

As seen by reference to the accompanying plan of the above fan, kindly furnished for this report by Mr. C. H. Sharar, its design is different from that of fans generally constructed in this district, and for that reason we thought it would be desirable and satisfactory to effect a fair, thorough test of its efficiency as a ventilator of mines. And as it was impossible to accomplish that, to our satisfaction, while the mine was in operation, owing to the changes effected in the length and rubbing surface of the air-ways by opening and closing the mine doors, and the increased friction caused upon the air-current by moving cars. The tests were made at night, October 24, when no work was done, and when everything effecting the airways remained stationary. The fire bosses examined the doors and airways after work ceased, and saw that everything was in its proper order, before the tests were commenced.

The fan was designed by Mr. C. H. Scharar, superintendent of the Wyoming section of the D. & H. C. Company's mines. He and Mr. William Rees, mining boss, and three other assistants, besides the writer, were present, conducting the tests. The measurements were effected carefully, and the result proved exceedingly gratifying, showing that an unusually large volume of ventilation was produced, and thus banishing all doubts of the success of the new fan.

The reader will observe that there are two fans each seventeen and half feet diameter, fastened upon the same shaft, about eight feet apart; and the power is communicated from the engines by a belt to a pulley-wheel five feet diameter, fastened on the fan shaft, midway between the fans. There are four inlets for the air to enter the fans, one on each side of each fan, and each is eight feet in diameter. The areas of these inlets are equal to the circumferential areas of the heel of fan-blades, and the blades are four feet wide by five feet long, having two inches of space on each side between the blades and casing. The area of the outlets at the tips of blades is twenty-six square feet each.

The fans are surrounded by a large building in which there is plenty of room for the air to enter the fans on all sides, and the air enter the building from the air shaft through a short stone arch made in the old furnace stack, having an area of passage equal to one hundred and seven square feet.

To ascertain the power applied by the engines in the absence of an indicator, the throttle valve was fully opened at different pressures of steam, and the piston speed, under that pressure, minus twenty-five per cent., deducted for losses by friction, was taken in the calculations.

The boilers which generate the steam are within about thirty feet of the engines, and the fires are supplied with draft by steam jets or blowers. The blowers would not be effective at a pressure low enough for our first test, so the valve had to be partly closed to run the engine at the required

speed. Therefore, the power of the engine is not given in that test. The velocity of the air was measured within about fifteen feet to the fans, and the water-gauge and revolutions of the fan were taken at the same time.

In order to ascertain the amount and direction of the natural ventilation the fan was stopped, and immediately the current of air reversed and flowed down the air shaft; this was measured, and found to be traveling at a velocity of fifty feet per minute, proving a natural ventilation against the fan equal to 5,350 cubic feet per minute. The fan was now tried at various speeds, the details and results of which are given in the tables marked A and B, following these remarks.

It is a remarkable fact that when the velocity of the fan was increased, larger volume of air was exhausted by each revolution of the fan-blades; perhaps the opposing influence of the natural pressure exerted against the fan, was, to some extent, the cause of this anomaly, but it prevailed also in the velocity of the air, as compared to the speed of the tips of fan-blades, which, on the last three trials, exceeded the velocity of blades.

While this fan is yielding excellent results it must be borne in mind that the favorable condition of the air-ways in the mine upon which it is placed has vast influence effecting the quantity of air discharged, with the application of a certain ventilating pressure. For instance, the application of eleven six tenths horse-power at this mine produces a current of air equal to 147,232 cubic feet per minute, whereas in many other mines where the condition of the air-ways are not so favorable for the free passage of air, the application of the same power would fail to produce more than 70,000 cubic feet, being less than one half the quantity produced at the Baltimore Tunnel mine. These facts should always be taken into consideration when the merits of a ventilator is to be tested.

The Baltimore Tunnel is an old colliery and has vast area of workings to be ventilated; but the air-ways are very large, leaving room enough for the air to travel at slow speed in all parts of the mine. Evidently this accounts for the singularly small water-gauge indications and low pressure required, to propel such large volume of air through its passages, and has material influence in enhancing the useful effect of the fan.

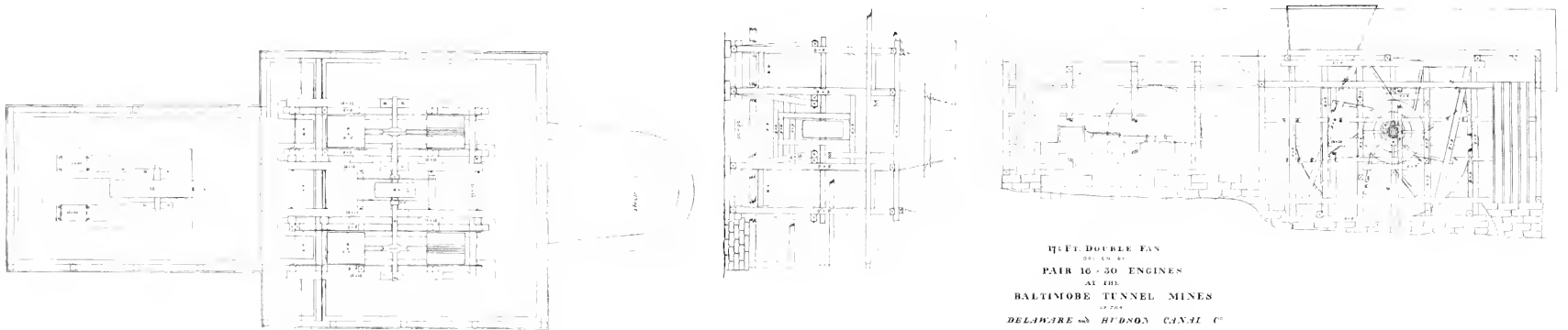
The result of our experiment and details of the calculations deduced therefrom are presented in the tables A and B, as follows:

TABLE A.—*Details of tests made with the new double fan, erected at the Baltimore Tunnel mines, Delaware and Hudson Canal Company, October 24, 1881.*

NUMBER OF TESTS.	Temperature of air outside in degrees Fahrenheit.	Temperature of outcast air in degrees Fahrenheit.	Sectional area of upcast.	Velocity of the air.	Cubic feet of air exhausted per minute.	Water gauge in inches.	Useful effect in horse power.	Horse power applied by engines.	Revolutions of fan per minute.	Cubic feet of air exhausted per revolution of fan.
First test,	62°	60°	107	638.66	68,337	0.1	1.07	. . . . .	28	2,440.60
Second test,	62°	60°	107	1,376	147,232	0.5	11.60	28.55	50	2,944.64
Third test,	62°	60°	107	1,923	205,761	1.0	32.42	45.98	69	2,982.00
Fourth test,	62°	60°	107	2,800	299,600	2.15	101.50	120.64	96	3,120.83

TABLE B.—*Continuation of tests made with Baltimore Tunnel Fan.*

NUMBER OF TESTS.	Velocity of the tips of fan-blades, feet per minute.	Velocity of the air in the fan outlet, feet per minute.	Ratio of the velocity of tips of fan-blades acquired by the air.	Effective pressure in pounds per square foot.	Pressure in pound per square foot expended upon velocity of air.	Pressure in lbs. per sq. foot expended upon friction of air in mine.	Percentage of pressure due to the friction of the air in the mine.	Power applied.	Power utilized.	Per cent. of the applied power utilized.	Difference of volume of air exhausted per revolution fan, cubic ft.
First test,	1,539.38	1,314.10	0.85	0.52	0.13	0.39	75.	. . . . .	1.07		
Second test,	2,748.90	2,831.38	1.03	2.60	0.60	2.00	76.9	28.55	11.60	40.63	5,586
Third test,	3,793.48	3,956.94	1.04	5.20	1.186	4.014	77.1	45.98	32.42	70.50	2,458
Fourth test,	5,277.88	5,761.53	1.09	11.18	2.506	8.674	77.5	120.64	101.50	84.10	2,107



17½ FT. DOUBLE FAN

PAIR 16 × 30 ENGINES

AT THE

BALTIMORE TUNNEL MINES

OF THE

DELAWARE AND HUDSON CANAL Co

DESIGNED BY

C. H. SCHARAR ENGINEER

Ambulances and Stretchers.

The law providing ambulances or stretchers for the purpose of conveying injured persons to their homes, is not worded as definite as it should be respecting the inspector's right to decide which shall be procured for each colliery. It is generally believed that stretchers are the best and most comfortable instrument to carry injured persons who live convenient to the mines; but when they reside too far to be conveniently carried upon stretchers, an ambulance constructed as prescribed in the law, should be provided for that purpose. The operators of this district have already procured two stretchers and two blankets for each of nearly all the mines, and it is gratifying to see the time, at last, arrived, when the hitherto inhuman treatment of hauling injured persons home in coal wagons must cease. Doubtless, many of the operators would have provided better conveyances long ago had they not entertained some doubt of the propriety of doing so. They felt it was not agreeable to anticipate the necessity of conveyances when all were hoping that nothing would occur causing the need of such. However, accidents seems to be inevitably connected with coal mining, and everything in our power should be done to guard against increasing the sufferers' pain while conveying them home. I am pleased to report that the operators of the mines manifest a disposition to comply with the requirements of the law in this respect most cordially.

Legal Proceedings.

Upon application before his Honor C. E. Rice, P. J., the following opinion was rendered, granting an injunction upon the Plymouth Coal Company, at Dodson shaft, Plymouth, Pennsylvania. The nature and circumstances of the case are fully set forth by his honor in a clear manner, and the opinion is therefore presented in full, as follows:

Common Pleas of Luzerne County.

Commonwealth ex rel. Williams, Mine Inspector, vs. *Haddock et al.—Construction of Statutes—Office of a Proviso—Jurisdiction of Court to Restrain Mining of Coal in Contravention of Mine Ventilation Act—New Workings.*

1. If it appears that a mine is being operated in contravention of the act of March 3, 1870, known as the mine ventilation act, it is the duty of the Court to restrain so much of the operation as is illegal, regardless of the question of fact as to extra hazard.

2. The defendants were owners of a coal mine operated through a shaft, and it was charged, and not denied, that they permitted men to work in the first and third seams (which were connected with a second opening) at the same time that other employés, not exceeding twenty in number, were at work in the fifth seam of coal, "for the purpose of working a gangway to connect with a second opening, not yet completed, to said seam:" *Held*—

(*a*) That the general terms of the enacting clause of the third section of

the act referred to, were it not for the proviso, would have a twofold application to this mine: First, upon the operations in the first and third seams; and second, on the work in the fifth seam—prohibiting the former, under certain circumstances, and prohibiting the latter absolutely.

(*b*) The office of the proviso in the same section is to avoid the necessary effect or application of the prohibition upon the opening of new mines and workings, and not to qualify the prohibition against permitting men to work in the other seams at the same time.

(*c*) While, therefore, the prohibition of the section does not apply to the work in the fifth seam, it does not thereby follow that the section has no application to the other seams.

(*d*) It does not follow from this construction that there is to be a total cessation of mining until the new working is connected with a second opening; but what the law requires is, that while men are actually employed in the new working, other men shall not, at the same time, be at work mining and hoisting coal from the other seams.

3. Office of a proviso in a statute discussed and defined.

4. Rules for construction of statutes discussed.

5. If, by reason of ambiguity, it becomes necessary to resort to considerations outside the letter of an act to learn the legislative intent, it is not improper to refer to the history of the legislation, the motive which led to it, and the evils it was intended to avoid.

6. History and purpose of the provisions in the mine ventilation act relating to second openings.

Motion for injunction.

Opinion by Rice, P. J.

The defendants are the owners of a coal mine operated through a shaft, and it is charged, and not denied, that they permit and employ men to work in the first and third seams of coal (which are connected with a second opening) at the same time that other employés, not exceeding twenty in number, are at work in the fifth seam of coal "for the purpose of working a gangway or gangways to connect with a second opening, which has not yet been completed, to said seam."

I. Section five of the act of March 3, 1870, (P. L., 3; P. D., 1069, pl. 5,) entitled "An act providing for the health and safety of persons employed in coal mines," provides that the Court, on the application of the inspector of mines, "shall prohibit, by injunction or otherwise, the working of any mine in which any person is employed in working, or is permitted to be for the purpose of working, in contravention of the provisions of this act." The simple question then is whether the method of mining complained of is in contravention of the provisions of the third section, not whether it is in this particular case extra hazardous. If the statute forbids it, then we must prohibit it, but if the statute does not forbid it, either expressly or by necessary implication, then the Court has no greater authority to interfere than it would have on a similar application in any other private,

though hazardous, business. The section, so far as material here, reads as follows: "It shall not be lawful for the owner or agent of any anthracite coal mine or colliery, worked by or through a shaft or slope, to employ any person in working within such coal mine or colliery, or to permit any person to be in such coal mine or colliery for the purpose of working therein, unless there are in communication with *every seam or stratum of coal worked in such coal mine or colliery, for the time being at work*, at least, two shafts, or slopes, or outlets * * * by which * * * distinct means of ingress or egress are always available to the persons employed: * * * *Provided*, * * * This section shall not apply to opening a new coal mine or colliery, *nor to any working for the purpose of making a communication between two or more shafts, slopes, or outlets, so long as not more than twenty persons are employed at any one time in the said new mine or working.*"

II. A proper understanding of the prohibitory clause of this section will aid us in the understanding of the restriction of its operation by the proviso or excepting clause. As preliminary to this examination it may be conceded that the working in the fifth seam is clearly within the terms of this proviso. It is being carried on for the purpose of making communication with a second opening, and not more than twenty men are employed therein at any one time. By the express terms of the proviso, then, it is not unlawful to employ and permit men to be in the mine for this purpose. But what in the prohibitory clause, taken by itself, makes it unlawful to employ or permit men to work in the first and third seams, which are connected with a second outlet? Clearly not the fact *per se* that there is another open seam connected with the same shaft, which has no second out-let; but the fact that there is another such seam, in the language of the statute, "for the time being at work." When no work is being done in the fifth seam, then, beyond doubt, it is lawful to permit the men to proceed with their work in the first and third seams; and, to repeat, when work is being carried on the fifth seam, then, in the language of the statute, it is a seam "for the time being at work," and it is therefore unlawful to proceed at the same time with the work in the first and third seams. But it will be observed further, that, by a literal reading of the prohibitory clause of the section, such working of a new seam, not connected with a second outlet, not only makes unlawful the working of the first and third seams at the same time, but is unlawful in itself, even though no men be employed in the other seams. In this connection, we refer to the suggestion that the terms, "every seam or stratum of coal worked in such coal mine or colliery, for the time being at work," do not include a seam in which the only work being done is the driving through coal to make a communication between two shafts or outlets. If this be the technical sense of the words, which we doubt, we do not think they were used in such sense, for they are not to be taken by themselves alone, but in connection with what follows. The subsequent words of the same enacting clause, which equally define the requirements of the law as

to second openings, show that the Legislature had in view the safety of, and hence required an available mode of ingress and egress for all "the persons employed in said mine," and for all "the persons employed therein," in which general terms are included, not only those men who are engaged in the profitable mining of coal or the mining of coal in its strict technical sense, but also those men who may be "employed" in the mine in just such work as this. It is only by thus understanding the language that we can give full effect to all parts of the section. Then, as we conceive, if it were not for the proviso, the general terms of the enacting clause would have a twofold application to this mine; first, upon the operations in the first and third seams; and second, upon the work in the fifth seam, prohibiting the former under certain circumstances, and prohibiting the latter absolutely; and hence, as the second application above referred to, would make it impossible to open new seams without an infraction of the letter of the law, there was necessity for a proviso, or saving clause. "The office of a proviso generally is either to except something from the enacting clause to restrain its generality, or to exclude some possible ground of misinterpretation of it, as extending to cases not intended by the Legislature to be brought within its purview." Minis *vs.* U. S., 15 Pet., 423. Remembering now the twofold operation of the enacting clause, and particularly its application to the opening of new mines and seams, and the necessity which there was for a qualifying clause, which, under certain restrictions as to the number of men to be employed, would permit such work, and there will be little difficulty in understanding the language of the proviso and its office in this section. Its terms are aptly chosen, and could not have been more so, to avoid the necessary effect or application of the prohibition upon the opening of new mines or workings, and not to qualify the prohibition against permitting men to work in the other seams at the same time, or, in the language of the statute, while the new seam is "for the time being at work."

III. Did the Legislature intend the language of the proviso to have a broader application than its exact words imply? In the affirmative, it may, perhaps, be argued that, notwithstanding the general terms of the enacting clause of the section, there would still, of necessity, be an implied right to prosecute work in a new seam, for the purpose of communicating with a second opening, that an express provision permitting such work would be superfluous, and that, therefore, the proviso was intended to accomplish some other purpose not to be implied. However, this might be, if there were no proviso, we are not authorized to assume that the Legislature so thought. On the contrary, there is conclusive evidence that, in the mind of the Legislature, there was necessity for an express qualification of the prohibition, so as to permit the prosecution of work for the purpose of reaching a second opening, to be found in its exception from its operation of new mines, where the legal implication of right from necessity would be much stronger than in the case in hand. While it is a proper rule that

a statute ought, upon the whole, to be so constructed that, if it can be prevented, no clause, sentence, or word should be superfluous, void, or insignificant; yet Lord Coke says, "*abundans cautela non nocet*, and the ancient sages of the law did ever make things as plain, and leave as little to construction, as might be."—*2 Inst., 375; Dwar. Stat., (Potter,) 100.*

So here a careful study of the section shows that the Legislature intended to leave nothing to implication, but that this subject of second openings or outlets should be as free from the necessity for judicial construction as human language could make it. But in the construction of statutes the will of the law-maker is not to be thwarted nor misinterpreted by a strict grammatical, or even logical construction of its terms, which leads to an absurd conclusion, or has an effect not contemplated when the law was made, if another and more reasonable construction is possible. So, also, it is but an artificial rule which exalts the office of either the enacting clause or proviso above that of the other, but it has been said "the true principle, undoubtedly, is that the sound interpretation and meaning of the statute on a view of the enacting clause and proviso taken and construed together is to prevail. If the principal object of the act can be accomplished, and stand under the restriction of the saving clause or proviso, the same is not to be held void for repugnancy."—*1 Kent Com., 463, (note a.)*

On a fair view of the whole section does the plain, though restricted, sense, which we have shown the language of the proviso to have, produce an effect not foreseen and intended when the terms were chosen, or involve any repugnancy difficult to reconcile, or lead to any absurd, or even unreasonable conclusion?

First. The whole context shows that this was not an unforeseen case. It was a well understood fact that two or more seams in the same mine would, in frequent cases, be worked at the same time, that new seams would, in all practical operations, almost necessarily be opened before the other seams connected with a second opening would be worked out, and, of course, that no new seam could be opened and instantly connected with a second outlet. All these conditions were directly in view of the legislative mind, and provision was intended to be made for them; therefore, we are compelled to assume that the words used to express the legislative will were chosen advisedly, and with a full knowledge and clear apprehension, not only of their import, but of their future application to a case like this; and we are equally bound to assume that no qualification or positive declaration was omitted, which the Legislature would have adopted, had it been legislating for this case alone.

Second. Neither is there any irreconcilable repugnancy between the enacting clause and proviso, but both can have full effect, and still stand together. This, I think, has been made sufficiently clear in our consideration of the twofold operation of the enacting clause, of its especial application to the opening of new seams and workings, and of the consequent necessity for the exception of such new workings therefrom.

Third. As to the consequences, it might well be said, if the work in all the seams must be wholly stopped until the new seam or working should be connected with the second opening, that this would be such an absurd and unreasonable conclusion as to preclude the idea that the Legislature intended the language to have that effect, and therefore it would be our duty to seek a more reasonable construction, if such a one were possible. But this is by no means the necessary effect of our construction, as every one acquainted at all with anthracite coal mining knows. Reasonable foresight will discover to the operator what will be the future necessity for opening new seams or workings, and reasonable prudence in management will readily discover opportunities for doing such work at times when men are not employed in mining coal for the market in the other seams. If such new working is postponed until the last moment, when, perhaps, the state of the coal trade and the profit of the operator seem to require that the mine should be operated to its fullest capacity, and that men should be constantly employed in the other seams, it is the fault of the operator, and not of the law, if the construction we have given to it works inconvenience and loss. To illustrate by the case in hand: It is said that three shifts a day are employed in the opening of the fifth seam, and that this, of course, occupies the full twenty-four hours. It is to be assumed that it has become necessary to the most profitable operation of this mine that this seam be opened and prepared for work at once. Hence it is urged that hardship will be wrought if the work in the other seams must be entirely suspended until this necessary work can be completed. To this the complete answer is, that this is not the effect of the law. All that the law requires in its most literal reading is, that while men are actually employed in the new working, other men shall not, at the same time, be at work in the other seams. It is, therefore, for the defendants to decide whether they will push this new working uninterruptedly to completion, and in the meantime suspend operations in the other seams, or whether they will work fewer shifts a day in the new seam, and thus give opportunity to work one or more shifts in the other seams. If this works inconvenience in prolonging the time necessary to prepare the new seam for profitable operation, or possibly loss, in that a total or partial suspension of the profitable working in the other seams has become necessary, the defendants cannot justly blame the law, because they might have foreseen such a condition of things, and by an earlier commencement of the new working they might have avoided any possible loss or inconvenience.

IV. In coming to our conclusion, we have not overlooked the affidavits submitted by the defendants, wherein it is substantially alleged, a matter of fact, that taking everything into consideration, the men working in the fifth seam are as safe when coal is being mined from the other two seams as they would be if work in those seams was, for the time being, suspended. Assuming, for a moment, this to be a relevant fact, let us examine some of the ground on which the inference is based.

First. It is argued that the coal mined from the fifth seam in driving the gangway must be disposed of, and for that purpose the breaker must be heated, and that, therefore, there is as great danger of the burning of the breaker, as though coal were also being hoisted and put through it from the other seams. Concede all this to be so, then it must follow that the burning of the breaker is one of the dangers necessarily incident to the opening of a new vein, and cannot be avoided. Being so, there is all the greater reason for ceasing the use of the shaft and machinery for the hoisting of coal from the other seams at the same time, so that they may be left free, so far as possible, for the rescue of the men employed in the new working in case of such accident.

Second. It is said that when the breaker is idle, or not in full operation, there is greater danger to it from the carelessness of loafers and tramps who congregate about it. Now, we cannot conceive this to be seriously argued. If there is danger from such cause, it is in no case unavoidable. A reasonable regard for the lives of those under ground, to say nothing of the motive of self-interest to prevent the injury and destruction of property, ought to prompt an effectual guard against it, whether there are twenty or one hundred men employed below.

Third. It is said that the machinery works more freely and with less danger from friction when constantly used. The answer to this is, that the statute does not contemplate an entire cessation of mining until the new vein or working has been connected with a second opening, as we have heretofore shown, and we do not understand from the affidavits that a cessation of such operations for one or two shifts each day, so as to permit the new work to progress, can have the effect of increasing the danger from this cause. A stoppage of the full use of the breaker, shaft, and machinery for such a considerable length of time as to cause additional risks upon their being again started, is not contemplated by the law.

Fourth. It is said any increased danger to the men in the fifth seam from the full use of the breaker, shaft, and machinery in the mining and hoisting of coal from the first and third seams is compensated by the increased care and watchfulness necessarily incident to such full use. However plausible this argument may seem, we cannot conclude that it was the reasoning of the Legislature. As we have shown from the generality of the prohibition clause, the Legislature thought that there was danger in the mining and hoisting of coal from any one seam, which would extend not only to the men in that seam, but also to the men working in the other seams, and sought, so far as possible, to provide against it. This, then, must be conceded to be an additional source of danger to the men employed in the fifth seam, and it does not appear, either in the expressed thought of the Legislature, or in the affidavits, that it might not be avoided, and at the same time the same degree of care and watchfulness be given to the shaft, breaker, and machinery, as though they were at the same time being used in the mining and hoisting of coal from the other seams.

But, as we have already suggested, these considerations seem to us to be aside from the inquiry before us. The question is not what our conclusion is upon the facts, but what the Legislature thought. If the Legislature thought such method of mining would increase the danger of accidents, and would correspondingly diminish the chances of the men in the fifth seam to escape in case of such accidents, and clearly prohibit it, then, in the application of the law, we are not authorized to consider the question of extra danger as a fact in issue.

We have thus been led to the conclusion that the plain sense of the terms used in the section forbids the method of mining complained of in this bill, and have sought in vain for any reason to assume that the Legislature intended the language of the proviso to have a broader effect in annulling the prohibition of the enacting clause than its plain sense implies. What room is there then for interpretation? When an act is expressed in clear and precise terms; when the sense is manifest, and leads to nothing absurb, there can be no reason not to adopt the sense which it naturally presents. To go elsewhere in search of conjecture, in order to restrain or extinguish it, is to elude it."

V. But if it would be proper or necessary to resort to considerations outside the letter of the act to learn the legislative intent, it would not be improper to refer to the history of the legislation, the motives which led to it, and the evils it was intended to avoid. "The reason of the law, that is, the motive which led to making it, is one of the most certain means of establishing the true sense; and great attention ought to be paid to it whenever it is required to explain an obscure, equivocal, and undetermined point or to make application of it to a particular case. As soon as we know the reason which alone has determined the will of him who speaks, we ought to interpret his words, and to apply them in a manner suitable to that will alone." Vattel's Rules, Dwar. Stat., (Potter.) 128. As everyone knows, this act was the immediate and legitimate outgrowth of the disaster at Avondale. If, at that time, there was any one necessity which, by reason of that accident, pressed more vigorously than any other upon the attention of the Legislature, it was the necessity for such express provision of law as would secure to every man employed in every mine so far as human forethough could provide it, an available mode of egress in case of accident. For the want of such provision, more than one hundred lives had been unnecessarily sacrificed. This, then, was the uppermost thought, and to prevent the recurrence of such a calamity was the first purpose of the law. With this broad view of the purpose of the law, we can see how the requirements of two openings for every seam worked was not the limit which the Legislature set for the exercise of its powers, but regard was also had for the fullest possible safety of those who should necessarily be engaged in opening new seams which could not at once be connected with a second outlet. So, also, from the sweeping character of the enacting clause of the section, which directs the prohibition to the whole mine and not to any

particular seam, vein, or working, we can see that the Legislature regarded the several workings in this same mine as a connected whole, and as such contributing to the common danger to all.

This being so, in making necessary exception of new workings, the Legislature clearly must have had in view, not only the dangers to the men employed therein necessarily incident to the same, but also other perils to the same men arising from the use of the shaft or slope and machinery in the mining and hoisting of coal from the other seams at the same time. The former could not be avoided, but the latter could, and it is impossible to suppose that when legislating for the great general purpose of reducing the dangers to all "the men employed" to the *minimum*, the Legislature should have used language, which, by a natural and reasonable construction, would tend to the full accomplishment of that purpose, without intending it to have that effect.

The sum of our conclusions is, that while the prohibition of the section does not apply to the fifth seam, it does not thereby follow that it does not apply to the other seams.

There remains but one other suggestion necessary for us to notice. It was urged that the question here presented was decided in Commonwealth *ex rel.*, *vs.* The Susquehanna Coal Company. The case is not reported, and no opinion was filed; but we have examined the bill and answer, from which it appears that the issue presented was quite different from the one before us. The prayer was for injunction against the entire operation of the mine; whereas, as we have here shown, the working in the new seam is in no sense unlawful. The answer also, was much more positive in its denial of the allegations in the bill than are the affidavits here filed. If we felt that the record in that case clearly showed an adjudication of the exact issue presented here, we would readily yield our own convictions. We do not think it does, however, and therefore we do not regard our conclusions as overruling the former judgment of this Court. On the contrary, while the point has not heretofore been ruled, we consider our conclusions as in entire accord with the spirit of the decisions of Judge Harding, in Commonwealth *vs.* Bonnell, 8 Phila., 534, and Commonwealth *vs.* Wilkes-Barre Coal and Iron Company, 29 Leg. Int., 213, and of Judge Dana, in Commonwealth *vs.* Tompkins, 1 Luz. Leg. Reg., 341.

And now, to wit: 4th April, 1881, it is ordered that an injunction issue restraining the defendants from employing and permitting persons to be in the first and third seams of coal, in the mine described in the bill, for the purpose of working therein, at the same time that any person or persons are at work in the fifth seam, until further ordered.

Messrs. Dickson & Atherton, for plaintiff. G. R. Bedford, Esquire, and G. W. Shonk, Esquire, for defendants.

Accidents in and around the Mines.

The facts elicited by investigation into the causes of mine accidents

shows that there is yet ample room for improvement in both the condition and general management of the mines, pertaining to the safety of the persons employed to work therein; and that the aggregate number of accidents can be considerably reduced by judicious application of a more effective discipline, commanding ultimate submission and compliance with the rules and regulations of the collieries in all cases appertaining to the safety of the employés; and by a greater attention given to their care, in general by the mine bosses and their assistants. Careless employés need close watching, for they are frequently found extremely indifferent to their own personal safety, and have to be compelled through harsh measures to secure their working places, and make them safe to work therein.

Fully two thirds of the accidents occurring in coal mines are evidently the direct consequences of the carelessness of the victims themselves; evidently some may be ascribed to a lack of practical experience with the work of mining coal. The careful observer would not fail to notice that rarely is the miner who takes time to see his work, and do it in a proper manner, found among the victims of accidents, especially accidents incident to the actual mining of coal; but the men who are known to be hasty, irritable and impatient of temper are remarkably numerous among the injured ones.

It is a well-established fact that too much haste often breeds serious blunders the effect of which frequently proves fatal; and the importance of taking time to work in a careful manner is frequently and forcibly impressed upon the miners of this district.

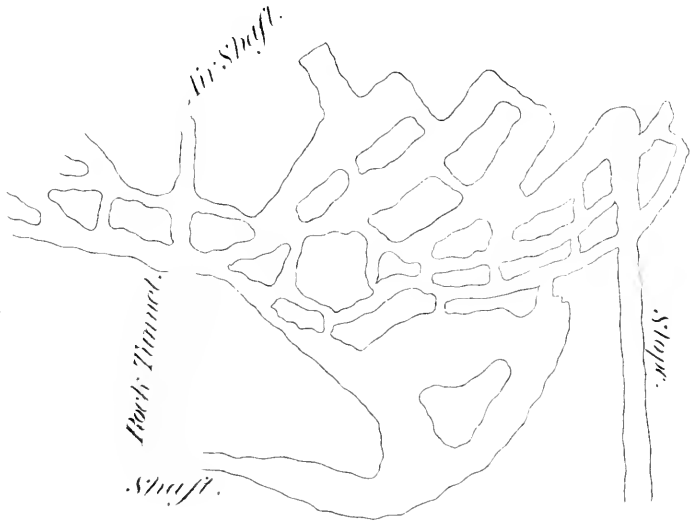
Persons who recklessly violate the established rules of the mines, and who do not heed the counsel and warnings of their bosses, are frequently the victims of severe and fatal injuries. I regret to find occasionally the officials themselves among the victims of gross neglect and recklessness. For instance, two fire bosses at, different collieries, one was fatally, and the other severely, burned during last year, by explosions of gas occurring through carrying naked lights on their morning examinations of the mine. Upon examination, after the accidents, it was discovered that they had been in the habit of doing so every morning previous to that. Eventually each came in contact with gas at unexpected points, and exploded it, before they were aware of its presence. These fire bosses should have considered more seriously that there is nothing discovered yet that will discover gas so effectually as naked light. The workingmen had trusted their lives upon the daily examinations of the mines made by these fire bosses. Were they reliable? Were they worthy of such unbounded confidence? Are such men, who are so reckless of the safety of their own lives, to be trusted with the care of the lives of others? I should say no, and confidently believe the unanimous answer of the workmen of this district would be emphatically the same. There may be others not yet caught by an explosion, who are tempted to carry open or unprotected lights, to obtain stronger light while walking through supposed safe places; but such dangerous and prohibited

— PLAN OF —

Section of Henry Shaft Workings, L. V. Coal Co.,

Showing the location where John E. Lewis was killed,

January 4, 1881.



REFERENCES:

Small Trap-door through which Lewis passed.
Where his body was found after the explosion.
Direction of the air currents.
Engine hoisting from the inside slope.
Pulley-wheel around which the rope passed.
Stone walls.

SCALE, 150 feet to one inch.

practices should never be resorted to in any coal mine, and I would, without hesitation, pronounce all persons who persist in doing so were they known, totally unfit to be fire bosses in any colliery, within my district. Further remarks upon the various causes of accidents can be seen under their respective headings in this report.

DESCRIPTIVE RECORD OF FATAL ACCIDENTS.

Fatal Accidents from Explosions of Gas.

Accident No. 2.—John Lewis, a fire boss, age forty years, was instantly killed by an explosion of gas, in the Henry shaft, January 4. After completing his morning examination, and finding the face of the working places all safe, he took his breakfast, and then concluded to examine three old breasts (see 1, 2, 3, on plan) near the bottom of the hoisting shaft, and between the underground engine and the air shaft. The opening of the breasts were all walled near the gangway, and a small slide door was made in the wall of No. 1, at A, to enable the bosses to pass through it when needed. A small current of air was allowed to return from the engine-house through the face of these breasts, to the outcast air-shaft, which had been sufficient, hitherto, to keep them perfectly safe. The deceased entered through the slide door A, and immediately after that, a terrific explosion occurred, tearing the walling and every movable thing to pieces, all the way to the engine-room. The engineer, Charles Grum, was slightly burned and otherwise injured, in the engine-room; and Lewis' lifeless body was found lying in the débris on the gangway, near where he entered the slide door. His open safety-lamp and match-box, were found lying close to his body. The most probable theory of the cause of explosion is that his light was extinguished by the strong draft of air passing through the slide door; and after closing the latter, he unscrewed his safety-lamp to re-light it; struck a match, which instantly caused the explosion. A large fall of roof had fallen in No. 2 breast since he had been there the previous day, which had exposed a strong feeder of gas; and it is supposed that this gas accumulated on top of the fall, to a point where the air current came in contact with it, and carried some towards the outcast, just when the deceased entered the slide door and struck light.

The lesson taught by this accident is, that fire bosses should always be upon the alert for surprising dangers, and if their safety lamp is extinguished, they should retire to a place where they are sure it is safe to strike a light. This precaution is of utmost importance for them, because the lamp is often extinguished by the presence of gas.

John Lewis was reputed to be a very careful fire boss, and was well respected in the community where he lived, and left a widow and five children.

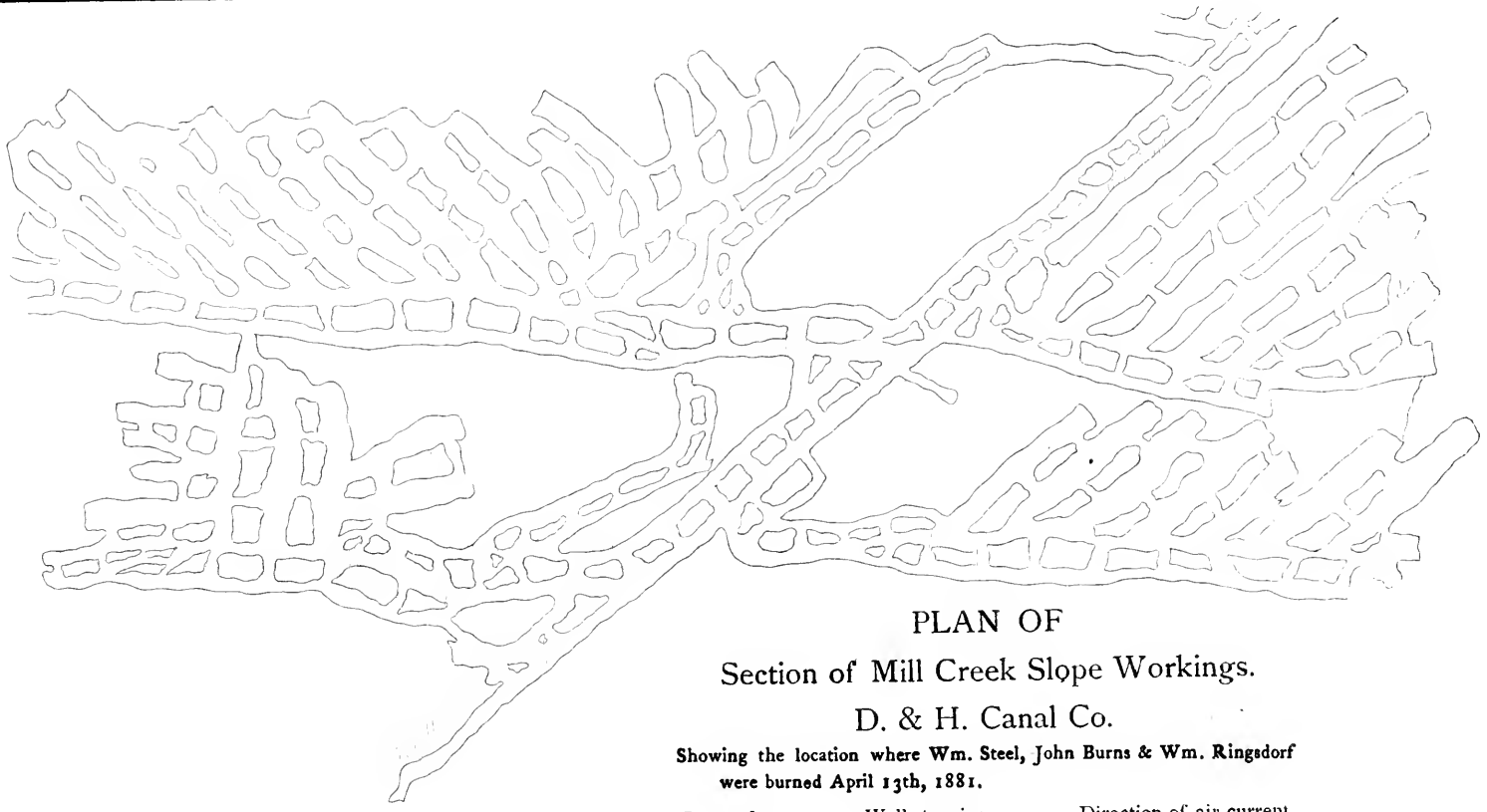
Accident Nos. 22, 23, and 24.—William Steele, a miner, age thirty-two years, John Burns, a laborer, age thirty-three years, and William Rings-

dorf, a laborer, age twenty years, were fatally burned by an explosion of gas in the Mill Creek slope, Delaware and Hudson Canal Company, April 18. Ringsdorf died from his injuries April 19, Steele April 20, and Burns May 12

This was, indeed, a very unfortunate accident, and neither of the three men who lost their lives by it were in the least to blame for it. They were working together on the night of April 18, taking a skip off the lower side of No. 11 gangway, near the bottom of the slope. They had loaded their last car, and were firing their last shot, when the explosion occurred. Fortunately, the runner, after taking the last cars up the slope, went home, or he would probably have suffered the same fate. The shot which they were firing was at the point marked *s*, (see plan,) and they had retired for safety to the cross-cut marked *o*, and where the air returned from the proving-hole; and simultaneous with the blast, gas rushed down upon their lights from the proving-hole and exploded, filling all available space with its burning flames. Before that, they entertained not the least suspicion of danger, and supposed the proving-hole was free of standing gas, for the air current passed the point where they worked the same as usual. The said proving-hole was driven in nearly direct line with the main slope to test an abrupt roll which impeded the progress of the slope. At first, it was raising at an angle of sixty degrees, gradually decreasing to the apex of the anticlinal, where it began to dip, and was finally abandoned. The ventilation was conducted to the face, from the cross-cut, by wooden brattice, as indicated by dotted line on the accompanying plan.

Mr. John E. Cook, the mining boss, expressed, as his opinion of the cause of the accident, that the canvas door at A was neglected—open until a quantity of gas had accumulated in the proving-hole, and when the door was closed, the air took its proper course, and forced the gas down upon them; hence the explosion. But the facts elicited during investigation did not sustain that theory, and in fact, to a certain extent, proves it improbable. William Steele, the miner, and Elijah Conner, the runner, stated positively that the door had not been open more than five minutes at a time, not long enough for any dangerous quantity of gas to accumulate, and that it had been closed, and remained closed, for nearly half an hour previous to the explosion. Therefore, it is not probable the explosion occurred in consequence of neglecting the canvas door. I learned that the fire bosses had not examined the proving-hole since Wednesday, April 13, and the fan was stopped for repairs nearly all day the following Saturday, April 16, and no one examined the proving-hole, the place most likely to find standing gas, until the explosion happened, Monday night, April 18.

This presents an explanation of the most probable cause of the accident. We are taught, by experience with such places as this proving-hole is, that when they are allowed to fill up with a large quantity of standing gas, it cannot be removed bodily by the simple force of the air current, however large it may be. This has been tried many times, and always proved a



PLAN OF

Section of Mill Creek Slope Workings.

D. & H. Canal Co.

Showing the location where Wm. Steel, John Burns & Wm. Ringsdorf were burned April 13th, 1881.

Cavass door. Wall stoppings. Direction of air current.

failure. The great difference existing between the weight of a column of carbureted hydrogen gas and that of air requires much more power to force the gas down into the air on the return side than is applied by the mere force of the momentum of the air current on the in-take side. The canvas door hung across at A would present much less resistance than the gas, and the current could effect easier passage through this door than through the gas, consequently, the air would pass through the place that presented the least resistance. It is evident, then, that this was the precise situation of the proving-hole in Mill Creek slope, when the explosion occurred, and that the gas accumulated in it Saturday, when the fan was not running, and remained there until the concussion of a strong blast released the pressure from it on the return side, when it was instantly forced down to the men's lights, and exploded. They suspected nothing wrong before this, because the air current easily passed the flimsy canvas door, and swept past the point where they were working, as usual. This theory seems the most probable, and is in harmony with the testimony elicited upon investigation of the accident; but it is a sad commentary on the management of the mine, and one that ought to teach the bosses there an effective lesson, which will not be forgotten as long as they have the care of men's lives upon their hands. Places like the said proving-hole should never be overlooked, and no satisfactory reason can be given for neglecting to examine them carefully every day the men are admitted into the mine.

ACCIDENT No. 48.—Christopher Haswell, a fire boss, aged forty-five years, was fatally burned by an explosion of gas, during his morning examination of the Dodson colliery, Plymouth, Pa., August 8. At first the officials of the mine thought the deceased only slightly burned, and reported so to the mine inspector; but it soon proved a very serious case, which resulted in the sufferer's death, August 18, 1881.

Upon investigation, the facts set forth showed that he was carrying a naked light upon his hat, while making his morning examinations of the mine, and the safety lamp in his hand. He walked up part of the way into the innermost breast, on the east gangway, threw off his coat, and was in the act of lifting his hat with the lighted lamp on it, when the explosion occurred. He was within about twenty feet of the face of the breast, which was pitching eighteen degrees, and nothing to turn the air up to it; and it had not been driven up far enough for the first cross-cut, so that an accumulation of gas was expected. After burning, he walked out to the bottom of the shaft, where he received assistance from the stable boss and others, who had just descended the shaft. He was married, and had six children depending on him for support.

ACCIDENT No. 63.—Thomas Riley, a miner, aged thirty-five years, was severely burned by an explosion of gas, in the Old slope, Franklin Coal Company, October 24, and died from his injuries, October 29. He had driven his breast up past the upper cross-cut far enough for another, when

gas began to gather in the face. Then he was sent, by the boss, into the adjoining breast, to drive a cross-cut through the pillar into his own. While he was working upon the said cross-cut, a small quantity of gas accumulated in the face of his own breast, and he was cautioned that morning not to go up there unless the fire boss accompanied him. Sometime during the day, while drilling a hole, he thought it was nearly through the pillar, and told his laborer to drill it, while he would go to the other side to listen how near through it was. So he went, and placed his lamp carefully upon the upper step of the manway. The breast was pitching about fifty-five degrees. When going to return, he picked his lamp up to place it on his hat, and ignited the gas. The quantity of gas was small, but he could not protect himself, owing to the steep pitch of the manway.

ACCIDENT No. 71.—Michael McManum, a laborer, aged twenty-five years, was fatally burned by an explosion of gas, in the Hollenback shaft, Wilkes-Barre, Pa., December 6, and died December 17.

In one of the gangways in this mine an unusually strong feeder of gas was tapped in the then inside breast, up about forty feet from the gangway. The vein is pitching about twenty degrees. The deceased, with two other men, were working in the gangway on the night shift, and a driver, with two door tenders, were attending them with cars. One of the door-boys walked in advance of the driver to open the doors, and the other followed to close them. While taking out the second trip of cars, the latter door-boy neglected to close the door which directed the ventilation into the breast where the blower was tapped, and, consequently, the gas accumulated very quickly. Within about ten or fifteen minutes after that, the deceased had occasion to go back to the door, and saw it open. There was no direct evidence that he closed it, but the circumstances attending the accident showed that he did, and walked outside of it with his light, when the air, taking its proper course up the breast, brought the gas down upon his light, and a terrific explosion ensued. Fortunately, there was no one else injured, although the others had a very narrow escape. McManum ought to have foreseen the effects of closing the door, and remained on the inside of it, where he would have been safe; but this does not lessen the blame attached to the neglect of the door-boy. He was employed to attend the doors, and through his negligence the means of causing this man's death was produced. When I investigated the accident, both door-boys were discharged from the mine, and during the coroner's inquest upon the case it was discovered that neither was of the age allowed by law for boys to be employed under ground. This proved a forcible illustration of the importance of not employing persons who are not of age to realize the consequences of neglecting the doors, by leaving them standing open in gasy mines. Michael McManum was married, but had no children.

ACCIDENT No. 73.—Patrick Barret, a miner, age thirty years, was burned by an explosion of gas in Sugar Notch slope, December 7, and died Decem-

ber 15. The deceased's working breast was only up about twenty feet from the gangway, and on a small pitch. The fire boss crossed his number on the "fire-board," which indicated that he should not work that day owing to the prevalence of gas in his breast. The fire boss also told him that he must not go into his place until they should put up a door and brattice to remove the gas. He, notwithstanding that, determined to work that day against all caution, and went in to his place with that purpose. Peter Murphy, a miner, who worked near him, spoke to him, advising him not to go, fearing he would be burned, but he replied saying, "That he was not going to loose a shift." Murphy told him the second time that he had better not risk it, but he did, and in less than five minutes after was burned. His injuries were not supposed to be the direct cause of his death, and the physicians thought it was caused by heart disease.

Accidents Nos. 75 and 76.—John Turner, miner, age nineteen years; and John Deitz, a driver, age sixteen years, were both fatally burned by an explosion of gas in the Prospect shaft, Lehigh Valley Coal Company, December 14, and both died within the same day. By driving the southwest gangway in this mine, it wound around a pointed ridge to a northeast direction, and quite a distance back from the curve two breasts were driven across over the apex of the ridge, and were subsequently connected by narrow headings driven from the gangway on the other side of the ridge to meet them. This being the shortest route, the air naturally took that course on its return from the gangway. On the afternoon before the day of the accident, a hole was effected in the face of the gangway, connecting with another section of the mine, through which the largest part of the ventilation immediately took its course. This hole being completed, the gangway was abandoned, but two loaded cars were left to remain there over night. About eight o'clock the following morning, the runner and driver went to bring the said cars out, took the short route through one of the breasts across the ridge, and, when upon the apex, an explosion occurred which spread consternation throughout the whole mine. While everybody was bewildered, trying to find the cause of the explosion, Evan Richards, a brave young boy, knowing the direction whither the boys had gone, went to look for them, and found both in the said breast terribly burned. He raised the weakest upon his back, and coaxed and encouraged the other to walk while he led him out of the poisonous gases resulting from the explosion, until others soon found them, and came to their relief.

The highest point in the breast, where the explosion occurred, was just seven feet higher in elevation than the gangway at each end of the breast. The ventilation having taken the new course effected at the face of the gangway, the gas naturally accumulated at this high point in the breast. The fire boss was within a few feet to it in the morning, but thought not of gas gathering there, and, therefore, did not examine it. It should be an unvarying rule in gassy mines, whenever a change is effected in the air-course, to ascertain its effect upon the former air-course. Acting accord-

ing to this rule, the presence of gas at that point in the Prospect mine would have been discovered by the fire boss early in the morning, and the accident could have then been averted. The boys also violated an established rule of the mine by attempting to cross through abandoned places, which was always prohibited. If they had gone around on the gangway road, they would have not went near the gas, and would be safe. Lessons thus costly taught I hope will be remembered, and acted upon. This completes the record of fatal accidents by explosions of gas for 1881, and those who are directly interested in coal mines ought to profit by the serious lessons derived from the mistakes causing this class of accidents. Certainly, there is room for improvement, and it behooves all to unite their efforts to reduce their number.

Fatal Accidents by falls of Roof and Coal.

Out of a total of seventy-one serious injuries sustained from the above causes, twenty-eight have proven fatal, and it is evident, the largest number occurred through either the carelessness, or lack of practical experience of the victims. To reduce this class of casualties, the miners must exercise more care for their own safety; and the mining bosses more care in employing none but experienced persons to mine coal; keeping strict surveillance over them, and compelling negligent ones to keep their working places secure.

ACCIDENT No. 4.—J. W. Poe, a laborer, age forty years, was fatally injured at the Salem mine, Shickshinny, January 13, and died the same day.

The deceased, with three other men, were working together, robbing pillars. Ordinarily, the roof was very safe, but at the place where they worked, a seam penetrated it right over the edge of the track. Two props were stood under it that morning, and they thought it then perfectly secure. Later in the day, while the four men were busy loading cars, the rock broke along the line of the pillar; discharged the props, and caught the deceased, and H. O. Mead, under it. The latter was quite seriously injured, but his life was not endangered. The deceased left a wife and three children.

ACCIDENTS Nos. 7 and 8.—Morris Evans, a miner, age sixty-five years, and Thomas Evans, his son, age eighteen years, were both instantly killed, in the Empire shaft, Wilkes-Barre, Pennsylvania, January 26.

They were robbing a pillar in the Hillman vein, and had won it nearly all off. On the other side from where they worked, the roof had fallen to a height of about twelve feet; and the edge of the remaining roof, rested on the stump of pillar which they were robbing. This morning, Evans noticed evidence of the crushing weight of the roof upon the remaining pillar, and hesitated to work there. He then sent for the fire-boss, to consult him upon the matter. The fire-boss came, and decided it not safe, and

told him to remain away until he should be informed where he should work next. Evans concurred, and decided to work with another man for that day; and while working with the latter, he concluded to return again to his own place, fire a short hole, and load what loose coal he had there. His son remonstrated and pleaded on him to remain away, because it was not safe; but the father's will prevailed, and both unfortunately returned. He drilled a hole in the remaining stump of pillar, which was already crushing under the pressure upon it; charged the hole with powder, and failed twice to fire it. Then Isaac Thomas, the miner who worked in the next place, came to their aid, and succeeded in firing it; when immediately the old man, desiring to profit by the crushing effect upon the pillar, took a drill, and rushed to poke the remaining coal loose. His son and Isaac Thomas, stood about six feet away, watching him. Suddenly a sharp loud crack was heard in the roof, and Thomas, instinctively retreated a few steps, saying at the same time to the old man, "that it was working fearfully." Another poke of the drill was given, and instantly something fell, and Thomas jumped away; a second and third fall followed, under which, both father and son, were caught and killed. Isaac Thomas barely escaped, and if he had one step more to make, would have shared the same fate. With all the power that could be applied to clear the fall, they were twenty-four hours finding the bodies. Morris Evans was married and had another son married, but had no small children.

Accident No. 14.—Lansford Titus, a laborer, age thirty years, was killed by a fall of coal in the Hollenback shaft, Wilkes-Barre, Pennsylvania, March 4.

He was loading the wheelbarrow near the face of the breast when a large piece of top coal sprang out from the solid coal, striking him upon his back and killing him instantly. This was one of the few casualties which may be properly called accidents. The deceased left a wife, with two young children, in very destitute circumstances.

Accident No. 15.—Anthony M. Shutt, a laborer, age twenty-four years, was instantly killed by a fall of roof, in the No. 4 tunnel, Nanticoke, Pennsylvania, March 5. He was laboring with a miner named Frank Keibler, and both went into the mine and up the breast together that morning. Shutt divested his coat at the tool box, went up to the face, and, without looking whether the place was safe or not, took a shovel and began to throw coal into the chute. In a few minutes after, while he was busy and unconscious of danger, a large slab of roof fell upon him and instantly killed him. The miner had not left the tool box yet, and he was much to blame for leaving his laborer go on before he examined whether it was safe or not. In no case should miners or laborers begin to work in the mornings before a thorough examination is made, insuring the safety of the place. Shutt was married, but had no children.

Accident No. 16.—Daniel Stevens, a miner, age fifty-three years, was instantly killed in the Nottingham shaft, Plymouth, Pennsylvania, March 8.

He was standing upon the bottom coal barring out loose coal left by a shot fired in the mining bench. Right over that, in front of him, was a piece of loose top coal called "blacksmith coal," the loose condition of which he evidently was not aware of, and while he was working there it fell, throwing him upon his back and landing upon his face, crushing his skull, with the result as stated above. The chamber was in all respect a very safe one to work in, and this accident happened in a singular way. He evidently did not apprehend any danger from what fell, and therefore did not examine it. He was an old experienced miner, and was generally very careful in work. He was married and had several full-grown children.

ACCIDENT No. 17.—Richard Bowden, a laborer, age twenty-one years, was instantly killed in the Laurel Run slope, March 28.

He was laboring for his father, and while the latter was drilling a hole about the center of the breast, the young man, with a pick, was mining under a slip of coal, which was leaning over him at an angle of about forty-five degrees, and behind which, was another slip, all loosened ready to drop, by a blast which had been previously fired in it. While he thus mined the coal in the most unworkmanlike manner, it fell upon him, crushing him against the clean hard bottom and was instantly killed. It is hard to conceive why he was allowed to attempt to pull it down in such a dangerous way when it could be barred down without incurring any risk at all.

ACCIDENT No. 18.—Bartle Garrahty, a laborer, age twenty-five years was instantly killed by a fall of rock, in the Baltimore slope, Plain township, March 28. He was laboring with a miner, named Patrick Commiskey, in a chamber where a bench of brittle top, about sixteen inches thick, was falling along with the coal, and could not be sustained successfully by props. A piece of this rock measuring about eight feet long, and three wide, remained in the roof, and was projecting out over the lower rib. March 28, about ten o'clock, A. M., the mine boss was in Commiskey's place, and the latter called his attention to the projecting rock, saying "it ought to have a prop under it." A gang of men is kept by the company to put up all the timbering needed in the mine, and the mine boss directed the miner to tell the prop-men to put one there. Soon after this, the traeklayers went there to extend Commiskey's road, when the coal, which was in the track way, was turned to the lower side under the projecting rock. While they were laying the track, some dirt dropped from the roof, and they feared the rock noted was going to fall. The miner then concluded to pry it down, made some futile efforts to that effect, but without success, and pronounced it safe. When the track was ready, they pushed an empty car on, and the laborer went under the dangerous rock to load the coal away; soon after that, it fell, and instantly killed him. It would not be right to leave this accident without pointing the mistakes and indifference of both the mining boss and the miner; for they were without doubt indirectly re-

sponsible for it; and had they done their plain duty in the matter, the accident would not have happened. Mine bosses should in no case leave a breast or any place, where their attention is called to a dangerous point, without seeing that it shall be secured before any other work is done there; and in this case the mine boss ought to either order the miner to secure it by standing a prop under the dangerous rock, pull it down, or to leave the place until the timbermen secured it and made it safe to work there. On the other hand, the miner should not to have left his laborer go under that rock until it was either secured or pulled down. He ought to have made more effort than he evidently did, to pull it down before pronouncing it safe. The attempt he made was ineffective because he tried it at the strongest end, in a very unworkmanlike manner, while if he had gone, and stood on top of the car, he could use his bar upon the end which had the longest leaverage, and evidently would have pulled it down with very little exertion. This ought to have been tried at least, before pronouncing it safe. He admitted in his evidence to the coroner's jury, that he was afraid to go under it, and yet allowed his laborer to work under it without admonition or warning from him. This accident was obviously the consequence of others more than the deceased's neglect.

Accident No. 21.—Benjamin Lewis, a miner, aged twenty-nine years, was instantly killed, in No. 1 slope, Nanticoke, Pennsylvania, April 15. He was working in a breast, in company with John Thomas, another miner. They fired a shot, and returned to see its effects. While both were kneeling side by side, near the face, consulting how the next hole should be drilled, a lump of coal from the bench, close to their heads, fell and killed Lewis instantly. The coal which fell measured only about seven cubic feet, but it sufficed to produce its fatal effect. Lewis was married, and had one child.

Accidents Nos. 25, 26, and 27.—Adam Urico, a miner, aged twenty years, John Martin, a laborer, aged thirty-three years, and Andrew Portick, a laborer, age not known, were all instantly killed by a fall of rock, in No. 2 tunnel, Nanticoke, Pennsylvania, April 29.

These three men were robbing a pillar on the lower side of a breast, and William Bayles and another man were robbing the pillar on the upper side of the same breast. The first party had loaded four cars, when Bayles went down to examine their place. The roof was cracking some, but not near as much as it usually did when near falling. Urico and Bayles came to the conclusion to put a prop at a point where the roof showed some indication of breaking; then the latter re-crossed the breast, and before he reached the upper side quite, the roof gave a loud crash and fell, burying the three men, on the lower side, under it, and slightly injuring Bayles, who was on the upper side. It was a very large fall, and they were nine hours uncovering the bodies of the unfortunate victims.

The work of robbing pillars is unavoidably dangerous, and the men selected to do this work should always be men who have had large experi-

ence in mines. William Bayles was an experienced man, and has had long practice in the work of robbing pillars, and from his testimony we are led to believe there was no particular blame resting on any one for this sad accident.

ACCIDENT No. 35.—Steven Lyons, a laborer, aged twenty-one years, was instantly killed, in the Hutchison shaft, Mill Hollow, June 20. He was laboring, with his father, in a chamber where the coal seam was blasting in two benches, both together about eight feet thick. There was a piece of the top bench unsafe, and they fired a blast in the bottom bench, expecting it would bring the loose piece down. They had also tried to pry it loose, and failed. Immediately after the blast was fired they returned, the father to bar out the loose coal in the bottom bench, and the deceased to load his car. When doing that the piece of top coal, which they knew was unsafe, fell and struck the young man on his head, killing him instantly. He was married, and had one child.

ACCIDENT No. 38.—Frederick Daniels, a miner, aged thirty-five years, was instantly killed by a fall of roof in the Avondale mines, Plymouth, Pennsylvania, July 1. The deceased and John B. Barney were working together, on shares, in a breast. A piece of the top bench, called by the miners "the devil's tier," had fallen, leaving the stone above it exposed, and some of it apparently unsafe. It was about twenty feet high, and they put up a ladder, stood upon it, and tried to bar it down, but failed. They then concluded it was safe to go under it to work. They pushed a car on, and were one on each side, loading it, when the rock fell, killing Daniels almost instantly. He was married, and left a wife and three children.

ACCIDENT No. 40.—Sylvester Mills, a laborer, aged sixty years, was fatally injured by a fall of roof, in the Diamond shaft, Wilkes-Barre, Pennsylvania, July 14. He was laboring, with Patrick Gill, in a breast just opened, and where the roof was seventeen feet high. The top usually consisted of bone coal, about twelve inches thick, and was considered an extraordinarily safe roof; but in this breast it proved only four inches thick, with a tier of slate over it about three inches thick. The miner said he sounded the roof that morning, thought it safe, and had not the least suspicion of danger. When he was in the cross-cut drilling a hole, and the laborer filling a car, about the center of the breast, the roof fell and injured the latter so severely that he died in a few minutes. He was married, and had two children.

ACCIDENT No. 41.—John Robison, a laborer, age fifty years, was severely injured by a fall of roof in the Exeter mine, West Pittston, July 15, and died the same day. He was loading a car near the face of the breast, had nearly finished it, when he went around to the outside end to arrange the coal. A large piece of "black rock" fell on him, breaking his leg, and injuring him around his chest and kidneys, which resulted in his death at four o'clock, P. M., the same day. The roof in this mine is a tough bench of wiry rider coal, and the so-called "black rock" is found in irregular patches imbedded in this roof, and frequently very difficult to detect its

presence, owing to the even regular appearance of the face of the roof. Where this accident occurred, the presence of black rock was not detected before it fell, which was about five inches thick in the center, tapering to a feather-edge on all its sides. It was ten feet long, and three feet wide, running diagonally across the breast. It fell without giving any warning, and there was no indication of its existence breaking the evenness or regularity of the roof before it fell. The miner sounded the roof near the face daily, and had had no reason to suspect any danger at that point. It acted here like it always does; sounded safe and solid until it became loose from the "rider coal," and then dropped. It is a treacherous stone, and has caused many serious injuries to the lives and limbs of employés of this mine. Whenever its presence is discovered, the order is to pull it down, no matter how safe or solid it may appear, for it has been frequently demonstrated that it never can be trusted to remain in the roof. Robison was married, and had five children.

Accident No. 44.—Frank Munley, a laborer, age twenty-four years, was instantly killed by a fall of slate in the Diamond shaft, Wilkes-Barre, Pennsylvania July 21. The deceased and another laborer, named Patrick Sharpe, were loading a car together on the night shift, in a counter-gangway, where the roof was twenty-two feet high, and a slab of slate about two inches thick fell upon them. They were both struck by it, but Sharpe soon recovered, and went for assistance. The miners happened to be in another place at the time, and when they returned, they found Munley lying upon the fallen slate, with his skull fractured, and dead. The roof at this place was generally a strong rock, but this flake of slate was something which they had not seen the like of before in that place, and had not suspected its presence before it fell.

Accident No. 45.—Michael Grogan, a miner, age forty years, was instantly killed in the Hartford slope, Ashley, Pennsylvania, July 25. His breast was pitching about 35° from the head of the chute to the face, and that space, being about thirty feet, was nearly clear of coal. He had just fired a blast in the face, and he and his laborer were at the head of the chute throwing in coal, when a fall of coal occurred in the face, and rolled down upon them, killing Grogan on the spot, leaving the laborer uninjured. The deceased was married, and had six children.

Accident No. 46.—Thomas Conniff, a miner, age thirty years, was killed at the old slope, Franklin colliery, near Wilkes-Barre, Pennsylvania, August 2. He was working in a chamber on a pitch of 35°, and had fired a blast in the "blacksmith" bench at the opening of a cross-cut. There was no one but him present, but it is evident he was standing upon some lagging thrown across from a prop to the rib, and was barring the loose coal left by the blast, when a large lump of coal unexpectedly slipped from the upper corner, and jammed him against the prop by passing. The miner in the next chamber heard the rush, and heard him groan, and ran to his assist-

ance, but his injuries were so that he died before reaching home. He was a widower, and had no children.

ACCIDENT No. 47.—Bryant Solon, a miner, age thirty-five years, was severely injured in the Gaylord slope, Plymouth, Pennsylvania, August 5, and died August 7. He was working in a breast, took an empty oil barrel to stand upon while barring down top coal. The barrel slipped from under him just when the coal was coming down. He fell forward and the coal rolled upon him, injuring him quite severely around his hips. While suffering from these injuries inflammation set in and caused his death. He left a wife and three children.

ACCIDENT No. 50.—James H. Davey, a miner, age forty-four years, was fatally injured in the Wanamie slope, Newport township, Pennsylvania, August 16.

He was working in a gangway on the night shift, and when the accident occurred was loading a car while his laborer was making a powder cartridge at the tool box. A large area of top coal fell and buried him underneath it. The laborer instantly went to his relief, soon found him, and removed the coal which was bearing upon him. His skull was fractured and he died shortly after taking him home. A bench of coal eighteen inches thick, the width of the gangway, about ten yards long, fell, and I was surprised if such a large fall had not, in some manner, apprised the deceased of his dangerous situation before it fell. There was a slip on the right, running its whole length and across at the face, and, upon examination of the place, it became evident that there must have been an unusual degree of carelessness exercised before such an accident could occur. Subsequently it was proven, by the confession of the other men who worked there, that they all knew the roof was dangerous, during the three days preceding the accident. They did not want to pull it down without consent of the boss; and when he, the boss, was in the place during that day, they forgot to call his attention to it. The day men sounded and examined it several times during their shift, and were afraid of it, yet they worked on in the danger and completed their day's work. The deceased, when he went in, examined it, and said to his laborer "that it was not safe,' and "that something ought to be done to it;" but he again worked under it until it fell and ended his life. The boss said he was there that day, and the appearance of the roof being even and smooth, he did not think it was dangerous, and no one said anything about it to him. His standing orders were to pull that bench down when it was not safe, and the company invariably paid for the trouble of doing so, as the coal in it was not marketable, and could not be sent to the breaker. It was too low to put timber across to support it, and the roof above was invariably safe and good. It is seldom we have such sheer recklessness to place on record as we have exhibited in this case; and it is difficult to conceive why men, who are good practical miners, will run such fearful risks without any apparent benefit or necessity deriving from it. Davey left a wife and five children who were dependent upon him for support.

Accident No. 59.—John Howells, driver, age seventeen years, was instantly killed in the Avondale mine, September 21. In Robert Thomas' chamber, near the place where it was opened to its proper width, where there was a very large stone lying, with one end about three feet up on the rib, and the other on the ground, leaving a large open space under it, and having one end projecting out near the track. The miner was drawing back top coal, and on the day before the accident occurred he fired a blast in that coal right over the said stone. The following morning the miner and his laborer were loading a car, and the driver was there waiting to take it out. When it was nearly loaded the boy went to put a sprag in one of the wheels and clean the dirt away, and, to do that, he had to go partly under the edge of the said stone, when a large piece of it broke and fell upon his head with the result stated. The miner ought to have stopped the boy from going there until he ascertained whether it was safe or not; but he was a hasty indifferent old man, and had not examined the stone since he fired the blast above it on the previous day. He said he did not notice the boy going under it, and most probably if he had, would not have said anything as long as he supposed there was no danger.

Accident No. 62.—William Cook, a miner, age forty-three years, was instantly killed by a fall of coal in the Gaylord slope, October 24. William and George Cook, two brothers, were working on shares in a breast. They were both practical, intelligent, and careful miners, and kept their place well secured by props. When the accident occurred, they were firing a blast, and retired to the adjoining breast while it was firing. Upon their return, after the blast, a triangular piece of the top coal, measuring twelve feet across its base, fifteen feet long, and two feet four inches thick, fell upon them, resulting as stated to William, and injuring George quite severely. Subsequent examination showed that the coal was cut on all sides by slips, and fell between the props on the track. It was their fatal mistake to return so soon after blasting, and they walked confidently under the falling roof, when under the impression that the effect of the blast caused the coal to crack, while it was really the roof over them that was cracking. The deceased was married, and left a wife, with seven children, who were depending on him for their support.

Accident No. 64.—Thomas Prater, a miner, age twenty-seven years, was killed in the Midvale slope, Plains township, October 29. He was working a breast on a pitch of about 10°, and was up from the gangway about twenty-five yards. The coal blasted in two benches, the lower about five feet thick, and the upper fifteen inches. The top coal was brittle and full of slips. He had worked under the top coal about four feet, fired a shot in the bottom, and instantly after it fired, he returned to poke the loose coal, without waiting to even look at the top coal, and in less than two minutes it fell upon him and killed him. He was excellent miner, but very hasty, and always in a hurry to do his work. If he had waited to listen

he would have heard the top coal cracking and threatening to fall, but he did not, and hurriedly walked on under it, and sacrificed his life.

He was married, and had two children. His wife gave birth to twins the same evening, but they died, and she was in a precarious condition for sometime, but she finally recovered.

ACCIDENT No 65.—Trevor Harrison, a miner, age thirty-three years, was instantly killed by a fall of bone coal in the Empire shaft, Wilkes-Barre, Pennsylvania, November 1. He finished his breast on the Hillman vein, and was directed to widen the cross-cut by taking a skip off the upper side. On the lower side, parallel with the rib of the cross-cut, a slip penetrated the bone coal in the roof, which, evidently, was not seen before the bone fell. Harrison fired a shot in the upper side, and instantly returned to work, but before he had struck the first blow, the bone fell on him, and killed him. I have no doubt that if he had waited five minutes after blasting, before returning, he would have escaped without injury, for it is evident the bone fell before that time passed. This is the third fatal accident in rotation which has occurred through the fatal indiscretion of returning to the face too soon after blasting. Harrison was married, and had two children.

ACCIDENT No. 70.—John Gallagher, a miner, age thirty-eight years, was fatally injured by a fall of roof in the Baltimore slope, November 28. He was working in the Baltimore seam where it was twenty-two feet thick, and he and his laborer were both filling the wheelbarrow, when a flake of thin slate fell upon him, injuring him very severely. At first they thought he would recover, but death ensued November 30. He was a married man, and had six children.

ACCIDENT No. 74.—Patrick Gannon, a miner, age forty years, had his foot crushed by a fall of coal in the Pine Ridge shaft, Plains township, Pennsylvania, December 13, and died at the Wilkes-Barre hospital, December 18. He was preparing to drill a hole in the bottom bench, and was on his knees on the bottom when a lump of top coal, weighing about three hundred pounds, fell and crushed his foot so that amputation was thought necessary in order to save his life. Through the ignorance of those who took him out, no effort was made to stop him from bleeding until they got out of the mine, when he was nearly exhausted from loss of blood. Here they tied cotton around his limb, and stopped the further loss of blood. He was then taken to the hospital, where his foot was amputated, after which operation he was very weak, and failed to recover his wonted strength, and, while in this condition, had an attack of *delirium tremens*, and died.

ACCIDENT No. 79.—Ambrose Griffin, a laborer, age twenty-five years, was instantly killed by a fall of coal in Baltimore slope, Plains township, Pennsylvania, December 21. He was laboring with a miner named Dennis McGroaty, taking a skip off the end of pillar on side of the gangway. The bottom coal was six feet, and top coal about five feet thick. Two holes, at right angles to each other, were previously fired in the bottom bench, and they

had cracked up into the top coal, and made that dangerous. The miner tried to bar it down, and failed. He then drilled a hole behind it to blast it down, and, in the meantime, left his laborer work under it loading coal. When he was in the act of charging the hole, the coal fell on the laborer, and killed him.

The reader can readily see how careless this miner was of the safety of his laborer, allowing him to work under coal which he knew was not safe. This was the first shift for the deceased to work in this mine, having come there to work while some repairs were being made at another mine in which he usually worked.

Fatal Accidents by falling down Shafts and Slopes.

Accident No. 56.—Hugh Conahan, a labor, age twenty-three years, was instantly killed in Sugar Notch slope, September 13. There is an average pitch of 50° in this slope, and the cars and men are hoisted up and down upon cages. The deceased was employed inside of the mine on the night shift; had completed his work, and came up the slope, where he waited for a companion, who he expected would soon come out of the mine. A gang of men were at that time employed repairing the slope, who had a platform fixed on the track so the cage on one side could not be hoisted all the way up. Therefore, those who desired to come up had to come half way on one cage, and cross over to the other on the center of the slope, to be hoisted the other half. While the deceased was waiting on top, a party at the bottom of the slope signaled to hoist, and, when hoisted to the center, were pretty slow effecting their crossing to the other cage, when Conahan sprang to look down, and see what delayed them. He opened a hinged plank, leaving an open space about eighteen inches wide, stooped down, and fell, headlong into the slope, and landing lifeless upon the cage at the feet of those he was looking for. He fell a distance of three hundred feet on a pitch of about 59°.

Accident No. 60.—James Williams, a sinker, age twenty-three years, was instantly killed by falling down a part of the Stanton air-shaft, Wilkes-Barre, Pennsylvania, September 24. He and another man were engaged removing a platform which was used timbering the shaft, about seventy feet from the bottom. The platform was rectangular, about four planks wide around the sides of the shaft, leaving a large open space in the middle. The deceased was hurriedly walking along the edge of the platform, when the plank under his feet canted, and threw him headlong through the open space down the shaft, with the result as stated. Like sinkers too frequently are, he was a bold reckless man at his work, and extremely indifferent to danger. He was married, and had three children dependent on him for support.

Accident No. 61.—Charles Vullroth, a laborer, age twenty years, was killed by falling down part of No. 2 shaft, Plymouth, Pennsylvania, September 27. The deceased, with a number of others, was descending the shaft about seven o'clock in the morning, and all, except him, stepped off

the cage at the upper vein. He, working in the lower vein, remained on board to descend there. When the ascending cage was at the top of the shaft, it was stopped for a moment to take on the ticket boss, who desired to ascend to the breaker upon it; and it was supposed that, at that time, Vullroth thinking the cage was on the bottom, carelessly stepped off, and fell to the bottom of the shaft, a distance of thirty-three feet. He was found by the footman lying in the cage pit dead, shortly after the occurrence. This accident demonstrated that it was decidedly wrong to stop the cages during their passage through the shafts when the men are on, and it should never be done unless they are previously told of the intention of doing so. This precaution, in all probability, would have saved this young man from committing his fatal mistake.

Fatal Accidents by Cars.

ACCIDENT No. 5.—Anthony Cuff, a miner, age forty years, was killed in the Diamond shaft, Wilkes-Barre, Pennsylvania, January 18. A train of thirteen loaded cars was left on the gangway road over night, about three hundred feet from the passing branch; and when they were being taken out the following morning, the deceased, on his way to work, met them and turned aside to let them pass. There was a grade of two and a half degrees in the track, and the two last cars had become detached from the train and were running at a distance of about twelve feet behind it. Cuff thinking all the cars passed, stepped into the gap, and was instantly struck down and killed. He was a widower, and left four children.

ACCIDENT No. 6.—James Sheers, door-tender, age thirteen years, was fatally injured in the Reynolds' slope, Plymouth, Pennsylvania, January 22, and died the following day. He was employed attending main doors near the turnout, at the bottom of the slope. The driver brought out two loaded cars, and little James closed the door, ran after the cars, jumped on the front end of the last one, fell, and the car ran over him with the result stated. He was a lively promising little boy, and was put in a safe, comfortable place to work. There was no necessity whatever for him to do what resulted so sadly to him; yet, against the repeated warnings of the driver, he persisted in the dangerous practice until this last fatal attempt. The driver ought to have informed the mining boss or the boy's parents, so they could use some more stringent measures to prevent his dangerous habits, but he was young, also, and did not think of that.

ACCIDENT No. 12.—Richard Williams, a laborer, age sixteen years, was instantly killed by a runaway car on the Red Ash Coal Company's slope, near Wilkes-Barre, Pennsylvania, February 24. He went outside to the office for oil, and was returning down the slope, when the first car, after noon, was being hoisted. When the said car was near the top, the rope broke, leaving the car back, which, descending at a fearful rate, caught Williams near the bottom of the slope, and tore him to pieces. There were several others sitting around a fire at the bottom of the slope, and four of

them were more or less injured. There was a safe convenient traveling way into the mine, and traveling through the slope, during working hours, was prohibited by the company; but Williams thought perhaps he could reach the bottom before they would start, took that fatal route.

Accident No. 28.—Edward Williams, door tender, aged thirteen years, was fatally injured in No. 4 slope, Nanticoke, Pennsylvania, May 12, and died from his injuries the following day. He was attending an air-way door where only seven cars passed during a day. The driver was pulling a car out, and the door-boy threw his door open, ran to meet him, walked alongside the mule, urging him on, when he slipped and fell under the car, with the result stated. The boy was cautioned several times by the mine boss and driver not to go away from his door, under any circumstances, and he had been reprimanded that morning for the same offense as that which cost him his young life.

Accident No. 34.—William Davis, a driver, aged sixteen years, was instantly killed in the Henry shaft, Plains township, June 16. It was the deceased's second day in this mine. He took his mule into the air-way to bring out two loaded cars. The runner was with him. The mule was hitched to the cars and started out, the runner walking before, and the driver riding on the front of the first car. When the cars passed through the air-way door, the driver was missing, and the runner and a miner who worked near there, went back, and found him lying on the road dead. His hat and lamp were found about ten feet further back, and it was evident that his hat was knocked off as he was passing out, and in looking after it at a point where a prop stood very close to the road, his head was caught between the corner of the car and prop and crushed. The props should never be placed so near the track as this one was, for they are, as every mine boss must know, very dangerous to those who have to accompany the mine cars.

Accident No. 37.—Edward McMullen, a driver, aged eighteen years, was instantly killed in the Forty-Fort mine, Kingston township, June 28. He was at the top of a run waiting for a trip, when a car came faster than they usually do, towards the head-block. He took a sprag and stood between a prop and the track, to put it in the wheel. The front wheel on the opposite side struck the block, and the sudden check threw the hind end of the car off the track towards the runner, and jammed him against the prop, killing him instantly. Another driver, who stood near, foresaw the danger, and called on him to get off, but almost simultaneously the accident happened.

Accident No. 42.—Thomas Madden, door-tender, aged fourteen years, was fatally injured in the Diamond shaft, Wilkes-Barre, Pennsylvania, July 16, and died on the way home. He was attending a check-door, and a team of mules was coming out on the gangway with a trip of four loaded cars, about three o'clock, P. M. Madden did not open the door, and the mules were forced by the cars to push it open. The driver, who was riding on the

front end of the cars, noticed something preventing the door from opening as free as usual, but thought not it was the boy, until he heard him scream, and before they succeeded in stopping, the cars ran over both his legs and literally crushed them. The little fellow persistently refused to say how he came to get under the cars; but the drivers thought he was sitting on the side of the track, with his back against the rib, and his legs across the rail, fast asleep, when the cars came upon him. They had seen him sitting that way before, and he was in the habit of falling asleep very frequently. Sometimes he slept so soundly that they had considerable trouble in awakening him.

ACCIDENT No. 43.—James Maxwell, company laborer, age fifty-eight years, was fatally injured in the Reynold's slope, Plymouth, Pennsylvania, July 21, and died shortly after the accident. He was sitting on the door boy's bench, a little outside of the door post, when a trip of loaded cars was being runned out on the gangway. The first car jumped the track, ran against the door post, knocked it down upon the deceased, and shoved the prop, bench, and him about ten feet before the cars stopped. The door boy sat by his side and escaped without injury. He, the door boy, usually went into a breast close by the door while the trip was passing; but because the deceased was sitting there then he thought it safe to sit with him. James Maxwell was married, and had two children depending on him for support.

ACCIDENT No. 51.—Elmer Jones, a door boy, age fifteen years, was fatally injured in the Reynold's slope, Plymouth, Pennsylvania, August 25, and died the same day at seven o'clock, P. M. He stood by his door while a trip of six cars was passing through it; had lost his light by opening the door. When the fifth car passed he stepped into the track, evidently thinking it the last car, and was instantly knocked down and the car ran over both of his legs. One was torn nearly off, and the other terribly crushed. This accident was evidently the result of the little fellow's mistake while in the darkness without light, and could not see whether the cars had all passed or not.

ACCIDENT No. 67.—Peter Moody, a footman, age twenty-four years, was fatally crushed by cars in No. 3 shaft, near Kingston, November 10, and died during the following night. The deceased and another young man were pulling an empty car off the cage when a loaded car ran in and jammed Moody between the two cars, resulting as already stated. The loaded car was started by another trip of cars, which was just being brought to the branch, and bumped it forward. The spragger was putting sprags to stop the trip at that time, and did not see the car until it was too far gone to prevent the accident.

Fatal Accidents by Explosions of Powder and Blasts.

ACCIDENT No. 13.—James Jordan, a miner, age thirty-five years, was instantly killed in the Exeter shaft, West Pittston, February 25. He had

prepared a blast ready to fire when his laborer left and went to the adjoining breast while it was firing. After the blast fired the laborer returned, and was horrified to see the miner lying on the road near the edge of the bottom coal, dead, and his face terribly crushed. He, the miner, evidently had thought the blast missed fire, and was on his way back to it when it exploded, and threw the coal directly into his face, and killed him instantly. He was married, and had five children.

Accident No. 32.—Stanislaus Lofskofski, a miner, age thirty-eight years, was fatally injured in No. 2 tunnel, Nanticoke, Pennsylvania, May 28; and died within two days after the accident. His breast was pitching about thirty-five degrees, and when firing a blast he hid among the loose coal, about half way down, while it exploded. When that occurred, the coal rushed down and crushed in his ribs, resulting as stated above. This accident was the result of sheer recklessness. No man that had any regard for his life, would attempt such an act, where the chances of escaping injury were so slim. He was married, and had three children.

Accident No. 33.—Michael Connolly, a laborer, age thirty-eight years, was instantly killed by a blast bursting through the pillar in No. 2 shaft, Plymouth, Pennsylvania, June 13. He was laboring with a miner named Patrick Burke, and a counter gangway was being driven obliquely across the chambers, which was now approaching very closely to their chamber; and was expected to break through and cut it off. John Hawkins, the driver, brought a car into their breast, and while the three were pushing it up, a blast was fired in the counter gangway, which, bursting through the pillar, threw the coal with terrible force directly upon them, killing Connolly, breaking Hawkins' leg, and injuring Burke quite severely. Subsequent investigation proved this the result of an imperfect arrangement between Burke and the gangway men, concerning the mode of signalling to one another, when blasting. The agreement was, that when they were ready to fire in the gangway, they were to rap on the coal with some instrument, such as a hammer or drill, and receive a similar reply from Burke; but if the latter should not rap back, they were to rap the second time, and immediately fire. The gangway men did as agreed; they rapped and received no response; rapped again and lighted the fatal match. The men in the breast were at that time, too busy with the car to heed the signal, and owing to the noise made by the car and the mule, did not hear it until the fatal crash of the blast bursted upon them, with its deadly effects. Agreements, in cases like this, ought to be explicit enough to insure a perfect understanding on both sides, that all parties are safe. Neither should fire a blast until he is certainly sure the other understood he was going to do so. Connolly was married, but had no children.

Accident No. 6.—Michael German, a miner, age thirty-one years, was killed in the Hartford mines, Ashley, Pennsylvania, June 28. He was working a breast, and stayed in it later in the day than men usually do. Patrick Hopkins and his two laborers were working in the gangway near

by, on the night shift. The laborers pushed a car, loaded with rock, out past German's breast; and by passing, saw him at the face, with a powder-charge in his hand. About half an hour later, when one of the laborers was returning, he heard him moaning up in the breast. the laborer immediately called his comrades, and all went up and found him lying near the head of the chute, very severely injured. He was a Polander, and could not speak English; but he replied to their inquiries, by saying "shoot! shoot!" which indicated he had been injured by a blast. He was taken out as soon as possible, and he died when at the head of the slope. Subsequent examination showed that he had just fired a blast in the top coal, which evidently, had exploded before he escaped to a safe place.

ACCIDENT No. 52.—Joseph Seignor, a miner, age fifty years, was fatally injured by a premature blast, in No. 1 shaft, Nanticoke, Pennsylvania, September 2. His hip was dislocated, and collar broken. He was removed to the Wilkes-Barre hospital, where he died September 9. He was married but the report did not state whether he had children or not.

ACCIDENT No. 56.—Griffith R. Jones, a miner, age forty-four years, was fatally injured in the Brown slope, Franklin colliery, September 9, and died the same evening. He was engaged blasting the bottom slate; had drilled a vertical hole, about two an half feet deep. He, and his laborer together, charged it half full of powder, and tamped it so tight, that they could not loosen the needle, until the pick handle was put through the eye, and the hammer used to drive it up. When this was done, so that the needle could be turned in the hole, the laborer picked up the tools, and had retreated only a few feet, when the blast unexpectedly fired. The laborer immediately called assistance and returned, and found Jones, lying about twelve feet from where the hole was, with his skull fractured, and insensible. His hat, and lamp, were found near the hole; but no one could tell how the blast was so unexpectedly exploded. The deceased was an experienced careful workman and well used to that kind of work. He was married and had four young children.

ACCIDENT No. 66.—Evan Williams, a miner, age forty-eight years, was fatally injured in the Prospect shaft, November 7; and died the same evening.

He was driving gangway in the five and half foot vein, where gas is freely emitted. He was firing a hole, using a straw squib with touch-paper match; and when he lighted the match he retreated to a safe place. After waiting few seconds in vain for it to explode he concluded it was "missed," and returned to renew the squib but, when he was near the hole, it exploded with the result stated. He was married, and had five children in very needy circumstances.

Fatal Accidents by Miscellaneous Causes.

ACCIDENT No. 49.—William Reiley, a driver, age fifteen years, was kicked by a mule in Prospect shaft, August 12; and died at the Wilkes-Barre

hospital, the following day. The mule was usually quiet and gentle, but was not willing to be whipped; and it was supposed the boy used the whip on the mule when he received a violent kick on his chest, resulting as stated.

ACCIDENT No. 53.—Evan M. Evans, a miner, age forty-four years, was killed in the Grand Tunnel, West Nanticoke, Pennsylvania, September 5. He was about finishing a breast, pitching forty-five degrees; and he supposed he had only about four cars of coal left, all of which was blocked a few feet above the battery. He went up with a pick in his hand to scrape the coal down, when a rush came and buried him under it, above the battery. They had to load two hundred cars, before his body was discovered, September 7, at three P. M. He was married, and had four children.

ACCIDENT No. 69.—Simon Hemla, a laborer, age thirty-five years, was killed in the Diamond mine, during the night of November 14. He was laboring for William Davies, a miner, in an airway, and was standing a prop, twelve inches thich, and eight feet six inches long. One stood on each side and lifted the end of the prop on their shoulders, when Hemla's foot slipped; the prop simultaneously slipping off Davies' shoulder, fell upon Hemla's neck, on the ground, killing him almost instantly. He had a wife living in Hazleton, Pennsylvania, and one child, and he had only worked a few days in this district, having recently came up from Hazleton.

Fatal Accidents Outside Around the Mines.

ACCIDENT No. 1.—Thomas O. Halloran, oiler of machinery, age sixteen years, had both arms crushed in cog-wheels in No. 2 breaker, Kingston, Pennsylvania, January 3, and died the same day. Before this date the breaker had to be stopped several times each day to lubricate the journals; but these were replaced a few days before this accident by self-lubricators, so that it was not necessary to stop any more to oil the rollers during working hours. Evidently, the oiler was led by his curiosity to look how the new arrangements were acting, when his arms were caught between the cog-wheels and were shockingly crushed. A shock of the machinery was heard, and he was discovered immediately after lying insensible near the cog-wheels. He remained unconscious until relieved from his painful sufferings by death at the time stated.

ACCIDENT No. 3.—Sidney Albert, a loader, age forty-five years, was killed at the Hartford breaker, Ashley, Pennsylvania, January 11. He and another man were pushing railroad cars under the chutes, and did not notice that the locomotive was pushing in a trip of empty cars at the same time, until he was caught between the jammers, and was instantly killed. It is remarkable that they did not see the approaching cars when both had their faces towards them at the time they were approaching. He left a wife, with four children, who were depending on him for support.

ACCIDENT No. 9.—Adam Scheopert, a driver, age eighteen years, was

killed at the Hollenback breaker, Wilkes-Barre, Pennsylvania, February 3. He was employed to dump culm, and occasionally to drive when a driver was not in work. On this day the boss employed a man to drive an unmanagable mule, which he did not want to trust to boys, and told Scheopert to show him a few trips. Instead of complying with his orders he drove the mule himself, and told the man to dump the culm. During the day the mule ran away with an empty car, when Scheopert was on the front end of it, and was crushed between the car and breaker timber. He was immediately removed to the hospital, but he lived only a few hours.

ACCIDENT No. 10.—Joseph Shanley, breaker boy, age thirteen years, was killed in the No. 5 breaker, Plymouth, Pennsylvania, February 10. He was employed keeping the coal running so it would not block in one of the coal telegraph. He strayed away from his work, and his clothing was caught and wounded around a revolving shaft, dragging him around with it, and killing him instantly.

ACCIDENT No. 11.—Lewis Davies, slate-picker, age ten years, attempted to board a train of culm cars brought by a locomotive towards the breaker, during noon hour, slipped, and fell under, and was instantly killed at No. 5 breaker, Nanticoke, Pennsylvania, February 18.

ACCIDENT No. 19.—James Nolan, slate-picker, age fourteen years, was instantly killed in the Hollenback breaker, Wilkes-Barre, Pennsylvania, April 12. He was sent by the slate-pickers' boss to start the rock which was blocking the rock chute. This was in an isolated part of the building, and by going to it the way he went, exposed himself to great danger, and was caught in the machinery and instantly killed. There was not a safe way to go while the machinery was in motion, and although the same boy had been many times before, doing what he was now requested to do, no one should have been sent there without providing a safer way than they had previous to this accident.

ACCIDENT No. 20.—John Wiley, locomotive engineer, age thirty-one years, was fatally injured by the explosion of locomotive, at the mouth of No. 1 tunnel, Nanticoke, Pennsylvania, April 13. He was employed running a mine locomotive in the above tunnel. Had been in with a trip of cars, and stayed inside for about three hours, and, when he came out, the water was exhausted in the boiler. He stopped at the water-tank near the mouth of the tunnel, applied the injecter to force water into the boiler, and instantly a terrific explosion occurred, bursting the locomotive into fragments, and throwing the deceased off about sixty feet away from where he stood, leaving him mortally wounded. The locomotive had just been repaired and was in good condition, but he applied water when the boiler was very probably nearly red hot, and that is supposed to have caused the explosion. He was married, and had one child.

ACCIDENT No. 39.—C. A. Garrison, laborer, age forty years, was fatally injured by attempting to board a train, between the Boston breaker and

shaft, July 2. He was going to work in the afternoon, when the locomotive was running in the same direction, attempted to board the locomotive and slipped and fell under the tender, when his leg and one arm were shockingly crushed. Both limbs were amputated the following day, and he died soon after the operation was performed. I have some doubt as to whether this accident should be accorded to mining or not, for it occurred on the railroad to a person not then employed at the work of mining or preparing coal. The deceased was married, and had four children.

Accident No. 54.—John Burk, a laborer, age fifty-five years, was fatally injured near the Hartford breaker, Ashley, Pennsylvania, September 6. He was repairing the track, near the foot of the plane, when the two mine locomotives, one taking an empty trip out on one track, and the other pushing a loaded trip in on the other track, where the deceased was standing in a pensive manner, looking on a guard rail he had just fastened, and he was so absorbed in his work that he did not hear the trip approaching, although the whistles of both locomotives were blown to warn him of his danger, until he was struck down and run over by the cars, with the result as stated. He spoke a few words, when taken up, to the effect that he did not notice the cars approaching, and he died within about five hours afterwards. He was married, and had seven children.

Accident No. 55.—Price Jones, ash-wheeler, age twenty-four years, was severely scalded by a boiler explosion, at No. 4 shaft, Plymouth, Pennsylvania, September 7, and died September 23. He was engaged loading ashes from under the boilers, when a boiler suddenly cracked, leaving the water and steam escape in large volume, enveloping him and scalding him very severely about his body and upon his face and hands. The boilers were inspected and reported in safe condition shortly before the accident, and subsequent examination of the facts relative to the case showed that the boiler must have received ill-treatment before giving way as it did. The fireman affirmed that he tried the gauges five minutes before the accident, and found water in the second gauge. It was the boiler inspector's opinion that the boilers had suffered from want of water, and it is evident something was wrong, although the wrong cannot be definitely placed, and in this case, at least the deceased was not in any way responsible for his injuries. He was married, but had no children.

Accident No. 58.—Christian Atzel, footman at breaker tower, age fifty-four years, was killed at the Exeter colliery, West Pittston, Pennsylvania, September 29. The result of this accident was surprising to all who witnessed it. At the place where it occurred there is a grade, equal to about one in sixty-five, in the track leading from the shaft to the tower, and the loaded cars, when taken off the shaft cage, run towards the tower foot. One of the cars, a little stiff, stopped a little sooner than usual, and Atzel went behind it to push, not noticing another car coming from the shaft. The spragger saw it, and shouted, but just as the deceased turned around to look, the car caught his knee between the bumpers. The shock was such

that he died in about five minutes, although his knee was not crushed. He was married, and had one child.

ACCIDENT No. 72.—John C. Charles, a slate-picker, aged eight years, was killed, in the Gaylord breaker, December 12. He was working under the direct charge of his foster-father, and was a bright, lively little boy. He had refused to attend school, and was taken to work, so that his father could watch over and take care of him. Johnny and another boy went out of the breaker, but soon returned again to their work. Soon after that they missed a piece of lamp-picker chain, which they had lost while outside. Johnny wanted to go and look for it, but did not want his father to see him go out again, so he slipped down through the No. 6 chute, and got out all right; but when trying to return the same way he slipped back and down under the main screen, which caught his clothing, dragged him around with it, and finally threw him into another chute, where he was found, shortly after, dead. This is another instance added to the number who lose their lives through their recklessness and disobedience to the rules of the works.

ACCIDENT No. 77.—John Hawker, a laborer, aged twenty-eight years, was crossing the gravity track, near the Sugar Notch shaft breaker, December 15, when the whistle was blowing the noon hour. At the same time an empty culm car came running upon that track at a fast rate, and struck him down, ran over him, killing him almost instantly.

ACCIDENT No. 78.—Joseph Ginnard, a slate-picker, aged eleven years, fell off the No. 2 breaker steps, at Nanticoke, Pennsylvania, December 19, and was fatally injured. When the whistle blew the starting time in the morning, the boys rushed up the steps, and when up about ten feet from the floor, the deceased struck his foot and fell, rolling off under the hand rail over the side of the stair, and landing on the engine-house floor. He was unconscious when picked up, and remained so until he died, shortly after being taken home.

Fatal Accidents at New Shafts.

ACCIDENTS Nos. 29 and 30.—Jeremiah Crowley, aged about forty-five years, and Patrick Quinn, about the same age, were both killed by a fall of clay, in Waddell's new shaft, Mill Creek, Pennsylvania, May 21. The shaft was down about sixteen feet, and they were beginning to timber it, when the clay, on one side, fell in upon the men, killing the above-named, and breaking George Dickson's leg. Crowley was married and had four children. Quinn's family was in England.

ACCIDENT No. 68.—Austin McGann, a fireman, aged twenty-three years, was fatally injured at the Audenreid air shaft, Wilkes-Barre, Pennsylvania, November 14, and died from his injuries, November 21.

He was employed to attend the boilers and air compressors. When the sinkers failed to use the air as fast as it was compressed, and its pressure becoming equal to that of the steam, the compressors always stopped on

the center, and the deceased, this time, used a bar, placing it in a hole in the rim of the crank-wheel, to pry it off the center without shutting off the steam, and the engine starting quickly, threw him over the crank, upon the piston-rod of the engine, where his skull was severely fractured, and brains scattered over the place. He was seen by a little boy who happened to be passing at the time it occurred, and he called for relief at once, but the deceased was lying beside the engine, unconscious, and remained so until he died. He had been attending the compressors for about two years, and always used to shut the steam off before attempting to push it off the center when stopped; and he must have overlooked that through a mistake, this time, for he knew the danger of prying it off without shutting off the steam, and the almost certainty of an accident resulting if the attempt should be made.

TABLE No. 3.—*A list of serious, but non-fatal, accidents in the Middle District of cident, for the year ending*

DATE.	No. of accident.	Names of persons injured.	Age.	Wife.	Children.	Name of the Collieries and their operators.	Location of the Collieries.
Jan. 4	1	Charles Grum,	40	1	3	Henry, L. V. C. Co.,	Plains township,
11	2	David Rees,	21	.	.	Hillman, H. B. Hillman,	do.
14	3	Patrick Hayes,	23	1	.	Oak Wood, L. V. C. Co.,	do.
13	4	M. O. Mead,	30	1	.	Salem, Salem Coal Co.,	Shickshinny,
18	5	Wm. P. Llewelyn,	35	1	4	Slope, No. 2, S. C. Co.,	Nanticoke,
20	6	Patrick Gorman,	50	W.	6	Wyoming, J. H. Swoyer,	Plains township,
21	7	James Finnegan,				Mineral Spring, L. V. Co.	do.
21	8	John McHale,				do. do.	do.
22	9	Jonah Roberts,	18			Nottingham, C. P. & Co.,	Plymouth,
25	10	Albert Silex,	16			Hillman, H. B. Hillman,	Plains township,
Feb. 2	11	Michael Finn,	12			Wyoming, J. H. Swoyer,	do.
2	12	Gairn Burt,	48	1	8	Pine Ridge, D. & H. C. Co.	do.
7	13	Fred. O. Cox,	25			Henry, L. V. C. Co.,	do.
8	14	Patrick Hone,	35	1	4	Franklin, F. C. Co.,	Near Wilkes-Barre,
10	15	David P. Gibbon,	17			No. 1 shaft, K. C. Co.,	Kingston,
14	16	John Bevan,	36	1		Oak Wood, L. V. C. Co.,	Plains township,
17	17	James Deaghan,	41	1	7	do. do.	do.
19	18	John Conley,		1		Hartford, C. P. & Co.,	Ashley,
24	19	Edward McEnroe,	20			Red Ash slope,	Near Wilkes-Barre,
24	20	Warren Webb,	19			do. do.	do.
24	21	James F. Davies,	16			do. do.	do.
24	22	Alfred Higman,	15			do. do.	do.
25	23	George H. Everett,	27			Diamond, C. P. & Co.,	do.
25	24	Thos. M. Williams,	28			Hollenback, P. & Co.,	do.
26	25	Willie Morgan,	15			E. Boston, W. G. P. & Co.	Near Kingston,
28	26	James Gorman,	20			Wyoming, J. H. Swoyer,	Plains township,
28	27	Darby Furey,	40	1	6	Hartford, C. P. C. Co.,	Ashley,
Mar. 4	28	Patrick Malone,	23			Laurel Run, D. & H. C. Co.	Plains township,
4	29	Joseph Storey,	15			Empire, C. P. & Co.,	Wilkes-Barre,
7	30	Thomas Watkins,	13			Enterprise, H C. R. & Co.	Plains township,
9	31	John Callory,	35	1		No. 9 colliery, C. P. & Co.	Sugar Notch,
9	32	David Herron,	30	1		No. 10 do. do.	do.
9	33	Frank Gallagher,	32	1		do. do.	do.
13	34	Patrick McGwigan	45	1		Empire, do.	Wilkes-Barre,
18	35	Thos. H. Hughes,	45	1	4	No. 4 slope, S. C. Co.,	Nanticoke,
21	36	William Alka,	14			No. 1 shaft, do.	do.
22	37	Edward McEntyre,	59	1		No. 10 colliery, C. P. & Co.	Sugar Notch,
22	38	Thomas Bowen,	19			No. 2 shaft, K. C. Co.,	Kingston,
28	39	John J. Williams,	30	1	1	Empire, C. P. & Co.,	Wilkes-Barre,
Apr. 1	40	Thomas Llewellyn,	16			Mineral Spr'g, L. V. C. Co	Plains township,
13	41	John McGee,	39	1	1	Tunnel No. 1, S. C. Co.,	Nanticoke,
19	42	William Gething,	45	1	7	Slope, No. 2, S. C. Co.,	do.
22	43	Morgan Samuel,	38	1	4	Grand Tunnel, S. C. Co.,	do.
28	44	William T. Jones,	15			Slope, No. 2, S. C. Co.,	do.
May 4	45	Archie Maxwell,	14			Reynolds No. 16, C. P. & Co	Plymouth,
4	46	Thomas Powell,	32	1	4	Red Ash, R. A C. Co.,	Wilkes-Barre twp.,
5	47	James McCabe,	65	1		Mineral Spring, L. V. Co.	Plains township,
7	48	John McGlynn,	45	1	3	Franklin, F. C. Co.,	Near Wilkes-Barre,
9	49	William Boyle,	16			No. 10 slope, C. P. & Co.,	Sugar Notch,
11	50	Hugh Connor,	50	1	4	Balt. Tunnel, D. & H. Co.	Near Wilkes-Barre,
13	51	William Howells,	27	1		Diamond, C. P. & Co.,	do.
13	52	Michael Dugan,	25	1	2	Slope, No. 1, S. C. Co.,	Nanticoke,
21	53	George Dickson,		1		Waddel shaft, T. W.,	Near Mill Creek,
June 2	54	Dominick Hart,	18			No. 9, Sugar Notch,	Sugar Notch,
2	55	Patrick Flood,	12			Hollenback, C. P. & Co.,	Wilkes-Barre,
3	56	Willam Rosser,	48	1		Wyoming, J. H. Swoyer,	Plains township,
4	57	James Puterbaugh,		1		Chauncy, McFarl'd & Co	Plymouth township,

Luzerne and Carbon counties, Pennsylvania, with remarks on the Cause of each Accident, December 31, 1881:

Remarks on Extent of Injury and Cause of Accidents.	Explosion of CH4 gas.	Falling of roof & coal.	Falling down shafts.	Crushed by mine cars	Explosion of powder and blasts.	Miscellaneous.	On surface.	Totals.	No. of accidents.
Slightly burned and bruised by an explosion of carburreted hydrogen gas,	1							1	1
Hands and shoulders burned by an explosion of powder,					1			1	2
Burned by an explosion of gas,	1							1	3
Slightly injured by a fall of roof. J. W. Poe was killed at the same time,		1						1	4
Three ribs broken by a premature blast,					1			1	5
Severely injured by being jammed between loaded cars near the foot of the shaft,				1				1	6
Both were burned by an explosion of gas—having violated the rules by going from their work into an idle chamber during night shift,	2							2	7 8
Arm broken by a kick from a mule,						1		1	9
Arm broken by a culm car out on the culm dump,							1	1	10
Skull fractured by falling from a platform twenty-five feet high at the breaker,							1	1	11
Ankle broken by a fall of coal in the face of the breast,		1						1	12
Toe broken and cut on his head by coal flying from a blast,					1			1	13
Severely injured by a premature blast,					1			1	14
Collar bone broken by being squeezed between the car and the mule,				1				1	15
Burned by an explosion of CH4 gas,	1							1	16
Face and hands slightly burned by an explosion of CH4 gas,	1							1	17
Back injured by a fall of rock,		1						1	18
All more or less injured while setting at the foot of the slope when the rope broke and left a car back down the slope upon them,									19 20 21
				4				4	22
Ribs broken by being crushed between a car and a prop,				1				1	23
Severely injured by a fall of coal in the breast or chamber,		1						1	24
Slightly burned by an explosion of a small quantity of gas,	1							1	25
Wrist broken by a car jumping the track when he was spragging it,				1				1	26
Severely injured by a fall of bone coal,		1						1	27
Severely cut on his head by falling under a car on the slope,				1				1	28
Hip bone fractured by being jammed between two cars,				1				1	29
Leg broken by a mule stepping upon it while on his way to the stable,						1		1	30
Leg broken by a fall of coal,		1						1	31
Both were burned by an explosion of gas which accumulated while they were preparing a charge of powder in order to blast,	2							2	32 33
Injured by a premature blast. The squib being defective,					1			1	34
Seriously injured by a fall of slate from the roof,		1						1	35
Leg broken by being jammed between cars,				1				1	36
Leg broken and otherwise injured by a fall of coal,		1						1	37
Knee cap broken by a fall of coal,		1						1	38
Collar bone and three ribs broken by a fall of coal,		1						1	39
Severely injured by falling under cars,				1				1	40
Slightly scalded and otherwise injured by the explosion of mine locomotive boiler,							1	1	41
Injured by getting on the wrong side and caught between cars and side of gangway,				1				1	42
Two ribs broken by a premature blast,					1			1	43
Leg broken by being jammed between two loaded cars,				1				1	44
Arm broken by falling under the cars,				1				1	45
Hand badly crushed by being jammed between the car jammers,				1				1	46
Eye destroyed by fragments of coal flying from blast,					1			1	47
Face and hands burned by an explosion of powder while making a cartridge,					1			1	48
Seriously injured by a fall of roof,		1						1	49
Leg broken in two places by a lump of coal flying from a blast,					1			1	50
Arm broken by the plane rope striking him when the hook broke,						1		1	51
Two ribs broken and severe cut on his leg by a fall of coal,		1						1	52
Leg broken by the clay caving into the new shaft upon him,						1		1	53
Leg broken through recklessly driving until the car jumped the track and struck him,				1				1	54
Severely cut on his thigh by a car running upon him,				1				1	55
Face and hands slightly burned by an explosion of fire-damp,	1							1	56
Face and hands burned by the explosion of a charge of powder in his hands,					1			1	57

TABLE NO. 3—

DATE	No. of accidents.	Names of persons injured.	Age.	Wife.	Children.	Name of the collieries and their operators.	Location of the Collieries.
June 7	58	John Larmouth. .	16	. . .	. . .	Nottingham, C. P. & Co	Plymouth, ...
8	59	Christopher Smith,	18	. .	. .	Empire, C. P. & Co., .	Wilkes-Barre, ...
8	60	William R. Thomas	60	1	. .	do. do. . .	do. . . .
8	61	John Irving, . .	19	. .	. .	Hollenback, C. P. & Co,	do. . . . .
13	62	Pat. Burke, ...	40	1	. .	Shaft, No. 2, D. & H. Co	Plymouth, ...
13	63	John Hawkins, . .	18	. .	. .	do. do.	do. . . . .
14	64	Wilson Andrews, .	22	. .	.	No. 5 Breaker, S. C. Co.,	Nanticoke, ...
14	65	Eli Parsons, . . .	16	. .	. .	Boston, D. L. & Co., . .	Plymouth township, .
15	66	Henry Van-Fosten	16	. .	. .	Wanamie, C. P. & Co.,	Wanamie, ...
18	67	David Williams, .	15	. .	.	Slope, No. 2, S. C. Co.,	Nanticoke, ...
22	68	Joseph Kroproski,	20	. . .	. . .	Prospect, L. V. C. C., .	Plains township, . . .
24	69	H. T. Woods,	22	.	.	Shaft, No. 2, S. C. Co., .	Nanticoke, ...
25	70	Thomas Crawley, .	14	. . .	.	Slope, No. 4, S. C. Co.,	do. . . . .
27	71	John Corcoran, .	23	. .	. .	Mill Creek, D. & H. Co.,	Mill Creek, ...
July 11	72	Thomas Howells, .	23	.	.	Slope, No. 4, S. C. Co., .	Nanticoke, ...
11	73	David Howells,	25	1	2	Slope, No. 4. S. C. Co., .	do. . . . .
14	74	Joseph Bowers,	23	.	. .	Wanamie, C. P. & Co., .	Wanamie, ...
15	75	John Stahl, . . .	22	. .	.	No. 10, C. P. & Co.,	Sugar Notch, ...
16	76	Henry Wedlock,	20	.	.	Balt. Tunnel, D. & H. Co	Wilkes-Barre, ...
18	77	Thomas Kearns, .	45	1	.	Slope, No. 2, S. C. Co., .	Nanticoke, ...
21	78	Oliver Kivler, . .	22	1	1	Shaft, No. 1. S. C. Co., .	do. . . . .
22	79	Methusalem Stone,	28	1	3	No. 7, Air Shaft, . . .	Wilkes-Barre, ...
23	80	William Lameraux	17		. .	Maltby, C. S. M., . . .	Kingston township, .
25	81	Michael McGlynn,	35	1	. . .	E. Boston, W. G. P. & Co.	do.
25	82	Reuben Cartwright	37	1	4	Shaft, No. 1, S. C. Co., .	Nanticoke, ...
26	83	Mrs. M. Sheridan,	. .	. .	.	Reynolds, C. P. & Co., .	Plymouth, ...
29	84	Isaac Titus, .	23	1	1	Gaylord, G. C. & Co., .	do. . . . .
Aug. 2	85	John Gallagher, . .	38	1		Oak Wood, L. V. C. Co,	Near Wilkes-Barre, .
2	86	Pat. Dougherty, .	. .	. .	. .	Henry, L. V. C. Co.,	Plains township, . .
3	87	Joseph Carver, . .	17	.		Grand Tunnel, S. C. Co.,	West Nanticoke, . .
3	88	John Lynott, .	32	1	3	Enterprise, A. L. & Co.,	Plains township, .
4	89	Alex. McGuire,	32	1	3	Hartford, C. P. & Co., .	Ashley, ...
5	90	Simon Zimmick, .	30	. .	. .	Nottingham, C. P. & Co,	Plymouth, ...
5	91	John Smart, . .	15	.	. .	Breaker, No. 2, K. C. Co	Kingston, ...
10	92	Neil McCole, . .	12	. .	. .	Wyoming, J. H. Swayer,	Plains township, . .
11	93	John Hriouak, . .	22	. .	. .	Prospect, L. V. C. Co.,	do. . .
15	94	Thomas P. Lewis, .	. . .	. .	.	Henry, L. V. C. Co.,	do. . .
17	95	William Meredith,	. .			Salem, S. C. Co., .	Shickshinny, ...
19	96	Charles Zukoski, .	44	1	6	Grand Tunnel, S. C. Co.,	West Nanticoke, . .
19	97	William Escott, .	22	1	1	No. 2, King C. Co., .	Kingston, ...
22	98	John L. Jones, . .	30	1	1	Empire, C. P. & Co., .	Wilkes-Barre, ...
23	99	David Richards, .	37	.	.	Hartford, C. P. & Co., .	Ashley, ...
24	100	Wm. Protheroe, .	15	.		Nottingham, C. P. & Co,	Plymouth, ...
26	101	James Welsh, .	28	1	1	Dodson, P. C. Co., .	do. . . . .
30	102	Richard Costello, .	41	1	7	Hollenback, C. P. & Co.,	Wilkes-Barre, . . .
31	103	Elias Griffiths, . .	24	. .	. .	Shaft No. 1, S. C. Co.,	Nanticoke, . . .
Sept. 2	104	John Martin, .	16	. . .	. .	Midvale, L. V. Co.,	Plains township, . .
2	105	Wm. F. Morgan, .	33	1	. .	Shaft No. 2, S. C. Co., .	Nanticoke, ...
2	106	Jos. Brandorski, .	28	. . .	. .	do. do. .	do. . . . .
2	107	Frank Crynoski, .	26	. . .	. . .	do. do. .	do. . . . .
6	108	David Davis, . . .	14	. . .	. .	Empire, C. P. & Co., . .	Near Wilkes-Barre,
6	109	Frank O. Harah, .	26	. . .	. .	Hollenback, C. P. & Co,	Wilkes-Barre, . . .

Continued.

Remarks on Extent of Injury and Cause of Accidents.	Explosion of CH4 gas.	Falling of roof & coal.	Falling down shafts.	Crushed by mine cars.	Explosion of powder and blasts.	Miscellaneous.	On surface.	Totals.	No. of accidents.
Leg broken by falling under the cars,				1				1	58
Severely bruised by falling under the cars,				1				1	59
Shoulder blade broken by a fall of slate, which struck him while carrying a load of boards,		1						1	60
Severely injured by being crushed between cars and side of gangway,				1				1	61
Injured by a blast exploding through the pillar from another chamber,					1			1	62
Leg broken at the same place and time,					1			1	63
Hand crushed by coupling cars, and two fingers had to be amputated,							1	1	64
Leg broken by runaway cars meeting him when going in with empty cars,				1				1	65
Arm broken by throwing it carelessly over an enclosure into the cog wheels,							1	1	66
Leg broken by cars taking the wrong switch, and crushing him against car,				1				1	67
Leg crushed under railroad cars at the breaker. His foot caught between the rails, and he failed to release it until the cars came upon him and crushed it,							1	1	68
Leg broken and badly cut on his head by a fall of rock,		1						1	69
Severely kicked on his head by a mule,						1		1	70
Slightly burned by the explosion of a charge of powder in his hands,					1			1	71
Facial bone fractured by a kick from a mule,						1		1	72
Kicked upon his leg by a mule. Not very serious,						1		1	73
Leg broken by a fall of coal,		1						1	74
Ankle dislocated and leg injured by being crushed between cars,				1				1	75
Severe flesh wound on his leg by falling under cars,				1				1	76
Severely bruised and cut by a premature blast,					1			1	77
Hip dislocated by a fall of roof,		1						1	78
Severely struck on his head by a small stone falling down the shaft,						1		1	79
Leg broken by a mule stumbling and falling upon him,						1		1	80
Lever slipped by putting a car on the track; struck him under his chin, and causing him to bite his tongue nearly off,						1		1	81
Face and hands burned by an explosion of gas,	1							1	82
Hip and one rib broken by cars running over her while crossing the plane outside,							1	1	83
Leg fractured by a fall of coal,		1						1	84
Face and hands burned by the explosion of a small quantity of gas,	1							1	85
Collar bone broken by a fall of roof while he was under it barring coal down,		1						1	86
Ankle broken by a car crushing it,				1				1	87
Two toes broken by barring coal down upon his foot,		1						1	88
Severely burned on his face and hands by an explosion of gas,	1							1	89
Severely cut upon his back by a piece of coal flying from the top bench of coal,		1						1	90
Injured by slipping off the steps and falling upon the track rail,							1	1	91
Both arms broken by playing and falling from a bridge to the railroad track,							1	1	92
Arm severely cut by falling under the culm car,							1	1	93
Face severely bruised by a premature blast caused by a defective squib,					1			1	94
Severely injured by a blast bursting through the pillar,					1			1	95
Leg broken and ankle dislocated by a runaway car on the underground slope,				1				1	96
Arm fractured by falling under cars,				1				1	97
Injured by a fall of coal throwing him down from top of bottom coal,		1						1	98
Face and hands slightly injured by trying to drill out a charge of Raud Rock powder, which exploded,					1			1	99
One toe cut off and one rib broken by falling under cars,				1				1	100
Leg broken by coal rolling on him while working out a shot,		1						1	101
Face, hands, and back slightly burned by and explosion of gas,	1							1	102
Breast bone broken by a premature blast,					1			1	103
Leg broken near his ankle by a piece of fire-clay falling and sliding upon him,						1		1	104
These three men were working together in a gangway. Gas accumulated in a high space over the timber, and a fall of roof brought it down to their naked lights, and exploded it, burning the three severely upon their faces and hands,	3							3	105 106 107
Arm crushed and had to be amputated, by falling under cars,				1				1	108
Arm broken and cut on his head, by a fall of coal,		1						1	109

TABLE 3—

DATE.	No. of accidents.	Names of Persons Injured.	Age.	Wife.	Children.	Names of the Collieries and their Operators.	Location of the Collieries.
Sept. 9	110	David P. Davies,				Avondale, D. L. & W. Co.,	Plymouth township,
9	111	Nicholas Scoble,				Laurel Run, D. & H. Co.,	Plains township,
10	112	Stephen Kipper,	45	1	7	Enterprise, L. & Co.,	do.
12	113	Samuel Jones,	18			Nottingham, C. & P. Co.,	Plymouth,
13	114	William Bratzel,				Pine Ridge, D. & H. Co.,	Plains township,
13	115	David Davies,	25			Empire, C. P. & Co.,	Near Wilkes-Barre,
13	116	Daniel H. Thomas,	30	1	2	do. do.	do.
17	117	Edward Mann,	48	1	2	Forty Fort, J. H. S.,	Kingston township,
20	118	Joseph Andrews,	25	1	1	Prospect, L. V. Co.,	Plains township,
21	119	Michael Kielty,	30	1		East Boston, W. G. P.,	Kingston township,
22	120	Anthony Shipinski	15			No. 2 Breaker, S. C. Co.,	Nanticoke,
29	121	William Harris,	15			No. 3 Shaft, D. & H. Co.,	Plymouth,
Oct. 1	122	James Dillon,	45	1	8	Franklin Coal Company,	Near Wilkes-Barre,
1	123	John Vinlinski,	25			Slope No. 4, S. C. Co.,	Nanticoke,
3	124	John Bryant,	15			Shaft No. 1, K. C. Co.,	Kingston,
4	125	John Krytzanofski	21			Slope No. 4, S. C. Co.,	Nanticoke,
5	126	Lewis Makofski,	11			Wanamie, C. P. & Co.,	Newport township,
5	127	Michael McGlynn,	16			East Boston, W. G. P.,	Kingston township,
6	128	William Maddox,	45	1		Boston, D. L. & W. Co.,	do.
7	129	Henry D. Mudge,	35	1		Franklin, F. C. Co.,	Near Wilkes-Barre,
15	130	Rowland Evans,	40			Diamond, C. P. & Co.,	Wilkes-Barre,
15	131	Adam Umberest,	65	1	2	Red Ash, R. A. C. Co.,	Near Wilkes-Barre,
17	132	Michael Hughes,	14			Exeter, L. V. C. Co.,	West Pittston,
17	133	Nicholas Helferick	40	1	7	Hollenback, C. P. & Co.,	Wilkes-Barre,
20	134	Henry L. Morgan,	22			Nottingham, C. P. & Co.,	Plymouth,
21	135	Edward Keefe,	28			Exeter, L. V. C. Co.,	West Pittston,
21	136	Michael Gallagher,	42	1	4	Mill Creek, D. & H. Co.,	Plains township,
22	137	George Cook,	39	1	4	Gaylord, G. C. Co.,	Plymouth,
29	138	Richard Eveleigh,	48	1	5	Slope No. 2, S. C. Co.,	Nanticoke,
31	139	John Hope,	14			Diamond, C. P. & Co.,	Wilkes-Barre,
Nov. 2	140	Thomas G. Thomas	40		3	Hollenback, C. P. & Co.,	do.
3	141	William D. Jones,	17			Gaylord, G. C. Co.,	Plymouth,
3	142	Patrick Riley,	22			Enterprise, A. L. & Co.,	Plains township,
7	143	Edw. Whitebread,	15			Breaker No. 5, S. C. Co.,	Nanticoke,
11	144	David L. Brown,	15			do. do.	do.
12	145	John W. Martin,	42	1	2	No. 3, D. & H. Co.,	Near Kingston,
16	146	David B. Richards,	39	1		Audenreid, C. P. & Co.,	Wilkes-Barre,
18	147	Manus Gallagher,	17			Empire, C. P. & Co.,	do.
18	148	John M. Seybolt,	50	1	5	No. 9, K. C. Co.,	Kingston,
23	149	Gething Powell,	26	1	3	Hollenback, C. P. & Co.,	Wilkes-Barre,
23	150	Patrick Reynolds,	28			do. do.	do.
26	151	Frederick Beck,	36	1	3	Woodward, D. L. & W. Co.,	Kingston,
30	152	Patrick Harrison,	40	1	6	Connyngham, D. & H. Co.,	Wilkes-Barre,
30	153	Patrick McGear,	40			Avondale, D. L. & W. Co.,	Plymouth,
Dec. 1	154	John Tucotch,	30			No. 2 Tunnel, S. C. Co.,	Nanticoke,
1	155	Michael Myofski,	35	1		do. do.	do.
2	156	Michael Beckin,	35			Nottingham, C. P. & Co.,	Plymouth,
5	157	John Golightly,	30	1	4	Pine Ridge, D. & H. Co.,	Plains township,

Continued.

Remarks on Extent of Injury and Cause of Accidents.	Explosion of CH4 gas.	Falling of roof & coal.	Falling down shafts.	Crushed by mine cars	Explosion of powder and blasts.	Miscellaneous.	On surface.	Totals.	No. of accidents.
Shoulder sprained and head severely cut, by a fall of coal,		1						1	110
Face and arms burned, by an explosion of powder at his tool-box,					1			1	111
Face and hands burned, by an explosion of gas,	1							1	112
Leg broken and cut on his head, by falling under a loaded car,				1				1	113
His foot caught fast between the rails until the cars ran over it, and severely crushed it,				1				1	114
Severely injured by a fall of coal, and was taken to the hospital,		1						1	115
Slightly injured by a fall of coal, while trying to release Davies,		1						1	116
Head and back injured, by a fall of rider coal,		1						1	117
Hips severely injured by being crushed between cars, near the breaker,							1	1	118
Back sprained and cut on his head, by a fall of a thin flake of slate,		1						1	119
Hand crushed in the cog-wheels of the counter-screen,							1	1	120
Stepped off the car to hurry his mule and fell, and the car broke his leg,				1				1	121
Collar-bone, arm, and ankle broken, by a lump of coal sliding upon him off the top of the bottom bench, while he was drilling a hole at the bottom,		1						1	122
Face and hands severely burned, by the explosion of a cartridge full of powder which he held in his hands,					1			1	123
Head caught between two cars while coupling them; he was struck senseless, but soon revived and walked home with assistance,				1				1	124
Leg broken in three places, by falling under a car when it was starting out from the chamber,				1				1	125
Leg broken, by playing with cars outside during noon hour,				1				1	126
Squeezed between car and roof; he was riding on the hind end of the car and it jumped the track, raising the hind end against the roof,				1				1	127
Injured by a fall of soapstone from the roof,		1						1	128
Back and face severely cut, by a blast exploding while he was adjusting the match,					1			1	129
Slightly burned on face and hands, by an explosion of gas,	1							1	130
Shoulder-blade broken, by a fall of coal,		1						1	131
Severe cut on his head, by striking it against the roof while on the mule's back,						1		1	132
Leg broken, by a car striking a sill against it while he was on the side of the gangway; the sill was lying along side of the track,						1		1	133
Was carrying a needle in his hand, and it ran into his side about three inches,						1		1	134
Face and arms burned, by an explosion of CH4 gas,	1							1	135
Two fingers broken and body bruised, by a premature blast,					1			1	136
Severely injured by a fall of coal; his brother was killed the same time,		1						1	137
Slightly burned, by the explosion of a half keg of powder,					1			1	138
Arm severely lacerated, by being caught in a pair of small cog-wheels,							1	1	139
Thigh bone fractured, by a lump of coal falling and striking the drill across his thighs,		1						1	140
Leg slightly injured, by an empty car jumping off the track,				1				1	141
Slightly injured, by being caught between car and rib,				1				1	142
Arm broken, by falling from a mule's back,							1	1	143
Jaw-bone fractured, by a kick from a mule,							1	1	144
Severely struck in his abdomen by a lever slipping, while lifting a car to the track,						1		1	145
Injured by falling off a platform in the shaft, a distance of twenty feet,			1					1	146
Arm broken, by riding up the slope on the cage,						1		1	147
Severely injured upon his ribs, by a fall of rock from under the top coal,		1						1	148
Face and hands burned by an explosion of gas,	1							1	149
Face and hands burned by an explosion of gas while barring top coal down, and having a naked light upon his hat,	1							1	150
Stepped on the end of a plank, plank tipped, fell fourteen feet upon rock and was considerably bruised,							1	1	151
Head and body severely bruised, by a fall of coal,		1						1	152
Leg and one rib broken by a fall of coal,		1						1	153
Severely injured by a blast bursting through the pillar,					1			1	154
Arm severely cut by the same blast,					1			1	155
Several fingers crushed by a fall of coal,		1						1	156
Hand severely lacerated by a loaded car running over it, while removing a block from before the wheel,				1				1	157

TABLE 3—

DATE.	No. of accidents.	Names of Persons Injured.	Age.	Wife.	Children.	Names of the Collieries and their Operators.	Location of the Collieries.
Dec. 8	158	John W. Owens, .		. .	. .	Warrior Run, D. & Co., .	Warrior Run, ...
9	159	Patrick Murray, .	19	. .	. .	Exeter, L. V. Co., ...	West Pittston, ...
10	160	John McNeilus,	17	. .	.	Diamond, C. P. & Co., . . .	Wilkes-Barre, ...
16	161	Joseph Cummings,	28	1	3	No. 10 Slope, C. P. & Co., . .	Sugar Notch, ...
16	162	Thomas Brennan,	19	. .	. .	Enterprise, L. & Co., ...	Plains township, . . .
21	163	Henry Boreck, .	28	. .	. .	Grand Tunnel, S. C. Co., . .	West Nanticoke,
21	164	James Gallagher, .	26	.	. .	Prospect, L. V. C. Co., . .	Plains township, . . .
24	165	Thos. Connyngham	40	1	1	Hollenback, C. P. & Co., . .	Wilkes-Barre, ...
24	166	Robert Lloyd, . .	28	. .	. .	Hartford, C. P. & Co., . . .	Ashley, ...
24	167	Robert Hughes, . .	24			do. do. . . .	do. . . . .
28	168	James Kitrick, . .	32	1	4	Hollenback, C. P. & Co., . .	Wilkes-Barre, ...
29	169	James Hayse, .	45	1	. .	Empire, C. P. & Co., ...	do.
31	170	Daniel Richards, .	29	. .	. .	Red Ash, R. A. Co., ...	Wilkes-Barre twp., .
		Totals, ...	. .	72	176		

Continued.

Remarks on Extent of Injury and Cause of Accidents.	Explosion of CH4 gas.	Falling of roof & coal	Falling down shafts.	Crushed by mine cars.	Explosion of powder and blasts	Miscellaneous.	On surface.	Totals.	No. of accidents.
Head cut and bruised on his body, by a fall of coal,		1						1	158
Slightly bruised around his hips and ankle, by a fall of black rock,		1						1	159
Leg severely bruised, by being jammed between cars,				1				1	160
Leg broken by cutting a side post off a prop car, and the posts rolled down upon him,							1	1	161
Hand crushed, by a car running over it when he was spragging it,				1				1	162
Thigh broken, by being caught between a car and a prop,				1				1	163
Foot and knee injured, by fall of top coal,		1						1	164
Knee slightly jammed between two cars, at foot of shaft,				1				1	165
Slightly burned by an explosion of CH4 gas,	1							1	166
Slightly burned by the same explosion of gas,	1							1	167
Scalp bruised, by a fall of top coal,		1						1	168
Foot severely crushed, by a fall of coal,		1						1	169
Severely injured around his head and body, by a fall of coal,		1						1	170
Totals,	24	43	1	44	25	16	17	170	

TABLE No. 4.—*A list of accidents resulting in death in the Middle District of cident, for the year*

DATE	No. of accidents.	Names of persons killed.	Age.	Widows.	Orphans.	Names of the Collieries.	Location of the Collieries.
Jan. 3	1	Thos. O. Holleran,	16	. . .	. . .	No. 2 breaker, ...	Kingston, ...
4	2	John E. Lewis, .	40	1	5	Henry shaft, ...	Plains township, ...
11	3	Sidney Albert, .	45	1	5	Hartford, ...	Ashley, ...
13	4	J. W. Poe, . . .	40	1	3	Salem, ...	Shickshinny, ...
18	5	Anthony Cuff, . . .	40	widr	4	Diamond, ...	Wilkes-Barre, ...
22	6	James Sheers, . .	13	. .	. . .	Reynolds, ...	Plymouth, ...
26	7	Morris Evans, . .	65	1	. . .	Empire shaft, ...	Wilkes-Barre, ...
26	8	Thomas Evans, . .	18	. . .	. . .	Empire shaft, ...	Wilkes-Barre, ...
Feb. 3	9	Adam Schoepert, .	18	. . .	.	Hollenback breaker,	Wilkes-Barre, ...
10	10	Joseph Shanley, . .	13	.	. .	No. 5 shaft breaker,	Plymouth, ...
18	11	Lewis Davies, . .	10	. .	. . .	No. 5 breaker, ...	Nanticoke, ...
24	12	Richard Williams,	16	.	.	Red Ash colliery, . .	Wilkes-Barre township, .
25	13	James Jordan, . .	35	1	5	Exeter shaft, ...	Exeter township, ...
Mar. 4	14	Lansford Titus,	31	1	2	Hollenback, ...	Wilkes-Barre township, .
5	15	Anthony M. Shutt,	24	1		No. 4 tunnel, ...	Nanticoke, ...
8	16	Daniel Stevens,	53	1	. .	Nottingham, ...	Plymouth, ...
28	17	Richard Bowden, .	21	.	. .	Laurel Run slope, .	Plains township, ...
28	18	Bartley Garahty, .	25	.	. .	Baltimore slope, . .	Plains township, ...
Apr. 12	19	James Nolan, . . .	14	. . .		Hollenback breaker,	Wilkes-Barre, ...
13	20	John Wiley, . . .	31	1	1	No. 1 tunnel, . .	Nanticoke, ...
15	21	Benjamin Lewis, .	29	1	1	No. 1 slope, ...	Nanticoke, ...
18	22	William Steele, . .	32	. . .	. .	Mill Creek slope, . .	Mill Creek, Plains twp., .
18	23	Wm. Ringsdorf, .	20	.	.	Mill Creek slope, . .	Mill Creek, Plains twp., .
18	24	John Burns, .	30	1	.	Mill Creek slope, . .	Mill Creek, Plains twp., .
28	25	Adam Uricko, . .	28	1	. .	No. 2 tunnel, ...	Nanticoke, ...
28	26	John Martin, . .	33	. . .	.	No. 2 tunnel, ...	Nanticoke, ...
28	27	Andrew Portick, .	30	. . .	. .	No. 2 tunnel, ...	Nanticoke, ...
May 28	28	Edw. C. Williams,	13	. .	. . .	No. 4 slope, ...	Nanticoke, ...
21	29	Jeremiah Crawley,	45	1	4	Waddell's new shaft,	Mill Creek, ...
21	30	Patrick Quinn,	45	.		Waddell's new shaft,	Mill Creek, ...
23	31	Stan. Lofskofski, .	38	1	3	No. 2 tunnel, ...	Nanticoke, ...
June 13	32	Michael Conley, . .	38	1	. .	No. 2 shaft, ...	Plymouth, ...
16	33	William Davies, .	16	. .	.	Henry shaft, ...	Plainsville, ...
20	34	Stephen Lyons, .	21	.		Black Diamond, . .	Mill Hollow, ...
28	35	Edward McMullen,	18	.	. . .	Forty Fort, ...	Kingston township, . .
28	36	Michael German, .	31	.		Hartford, ...	Ashley, ...
July 1	37	Frederick Daniels,	35	1	3	Avondale, ...	Plymouth township,
2	38	C. A. Garrison,	40	1	4	Boston, ...	Near Kingston, ...
14	39	Sylvester Mills, . .	60	1	2	Diamond, ...	Wilkes-Barre, ...
15	40	John Robinson,	50	1	5	Exeter shaft, ...	West Pittston, ...
16	41	Thomas Madden, .	14		. .	Diamond, ...	Wilkes-Barre, ...
21	42	James Maxwell, .	58	1	2	Reynold's slope, . .	Plymouth, ...
22	43	Frank Munley, .	24	. . .	. . .	Diamond, ...	Wilkes-Barre, ...

Luzerne and Carbon counties, Pennsylvania, with remarks on the cause of each accending De ember 31, 1881.

Remarks on the Causes of the Accidents.	CAUSES OF THE ACCIDENTS.								No. of accidents.
	Explosions of CH4 gas.	Falling of roof and coal.	Falling down shafts.	Crushed by mine cars.	Explosions of powder and blasts.	Miscellaneous under ground.	On surface.	Total.	
Arms crushed in the cog-wheels of the breaker-crushers; died the same day,							1	1	1
Instantly killed by an explosi on of carbureted hydrogen gas,	1							1	2
Crushed between railroad cars near the breaker, and died instantly,							1	1	3
Fatally injured by a fall of roof; died during the same day,		1						1	4
Killed by cars running over him on his way into the mine,				1				1	5
Fatally injured by being crushed between loaded cars near his door in the mine,				1				1	6
The father and son; they were working together, robbing pillars in the Hillman vein, and were both instantly killed by a very large fall of roof,		2						2	7 8
Fatally injured by being crushed between a car and frame work of the breaker,							1	1	9
Instantly killed by being dragged around a revolving shaft in the breaker,							1	1	10
Instantly killed by trying to board a train of culm cars, and falling under them,							1	1	11
Killed by a runway car on the slope; the rope broke, and left the car back upon him,				1				1	12
Killed by returning to a blast under the impression that it had missed firing,					1			1	13
Killed by a fall of coal in the face of the breast,		1						1	14
Killed by a fall of rock immediately after beginning to work in in the morning,		1						1	15
Instantly killed while barring down some loose coal, and was struck by coal falling from the over-lying bench,		1						1	16
Instantly killed by coal falling upon him while he was mining under it,		1						1	17
Instantly killed by a fall of rock while loading a car in the chamber,		1							18
Was caught in the machinery of the breaker and instantly killed,							1	1	19
Fatally injured by an explosion of the locomotive boiler; died April 15.							1	1	20
Neck broken, and instantly killed by a small fall of coal,		1						1	21
Died April 20, These three men were working together on the night shift, and were fatally burned by an explosion of CH4 gas; for details of the accident, see another part of the report,	1							3	22 23 24
Killed, These three men were working together, robbing pillars, when, without any warning, a large mass of the over-lying rock fell upon them burying them under it, and killing them instantly,		3						3	25 26 27
Fatally injured by falling under cars, and died May 18,				1				1	28
Both were instantly killed, by the side of a shaft caving in upon them; the shaft was only thirty feet in depth, and they were just beginning to put the first temporary timber to sustain the clay, when the accident happened,									29 30
Fatally injured by not going to a place of refuge from a blast; died June 1,					1			1	31
Instantly killed by a blast, exploding through the pillar from the adjoining breast,					1			1	32
Instantly killed by being crushed between a car and prop,				1				1	33
Killed by a fall of top coal in the face of the breast,		1						1	34
Instantly killed by a car jumping off the track, and crushing him against a prop,				1				1	35
Fatally injured by a premature blast; died while being taken home,					1			1	36
Instantly killed by a fall of rock in a chamber,		1						1	37
Attempted to board the mine locomotive, and fell under the tender; his leg and arm were crushed. Next day both limbs were amputated, hoping thereby his life could be saved, but he died soon after the operation,							1	1	38
Fatally injured by a fall of roof, and died within a few hours,		1						1	39
Fatally injured by a fall of black rock; died the same day,		1						1	40
Fatally injured by cars crushing both legs; died while being taken home,				1				1	41
Fatally injured by cars jumping off the track and knocking a door prop down against him. He died from his injuries the same day,				1				1	42
[illegible] killed by a fall of slate,		1						1	43

TABLE No. 4—

DATE.	Number of accidents.	Names of persons killed.	Age.	Widows	Orphans.	Names of the Collieries.	Location of the Collieries.
July 25	44	Michael Grogan,	40	1	6	Hartford,	Ashley,
Aug. 1	45	Thomas Connill,	30			Franklin mines,	Near Wilkes-Barre,
5	46	Bryant Solon,	35	1	3	Gaylord slope,	Plymouth,
7	47	John Jennings,	17			Gaylord breaker,	Plymouth,
8	48	Christ. Haswell,	45	1	6	Dodson shaft,	Plymouth,
12	49	William Reiley,	15			Prospect shaft,	Plains township,
16	50	James H. Davey,	44	1	5	Wanamie,	Wanamie,
25	51	Elmer Jones,	15			Reynolds slope,	Plymouth,
Sept. 2	52	Joseph Seignor,	50	1		No. 1 shaft,	Nanticoke,
5	53	Evan M. Evans,	44	1	4	Grand tunnel,	West Nanticoke,
6	54	John Burk,	55	1	7	Hartford, No. 6,	Ashley,
7	55	Price Jones,	24	1		No. 4 colliery,	Plymouth,
9	56	Griffith R. Jones,	45	1	4	Franklin colliery,	Near Wilkes-Barre,
13	57	Hugh Conahan,	23			No. 10 slope,	Sugar Notch,
20	58	Christian Atzel,	54	1		Exeter,	West Pittston,
21	59	John Howells,	17			Avondale,	Plymouth township,
24	60	James Williams,	25	1	3	Audenreid air shaft,	Near Wilkes Barre,
27	61	Charles Vonrath,	21			No. 2 shaft,	Plymouth,
Oct. 24	62	Thomas Riley,	35			Franklin colliery,	Near Wilkes-Barre,
24	63	William Cook,	42	1	7	Gaylord slope,	Plymouth,
31	64	Thomas Prater,	28	1	2	Midvale slope,	Plains township,
Nov. 1	65	Trevor Harrison,	30	1	2	Empire shaft,	Near Wilkes-Barre,
7	66	Evan Williams,	49	1	5	Prospect shaft,	Plains township,
10	67	Peter Moody,	24			No. 3 shaft,	Plymouth,
15	68	Simon Hemia,	35	1	1	Diamond,	Wilkes-Barre,
14	69	Austin McGan,	23			Stanton air shaft,	Wilkes-Barre,
28	70	John Gallagher,	38	1	6	Baltimore slope,	Plains township,
Dec. 6	71	M. McManamum,	26	1		Hollenback,	Wilkes-Barre,
7	72	Patrick Barrett,	30			Sugar Notch slope,	Sugar Notch,
12	73	John C. Charles,	8			Gaylord breaker,	Plymouth,
13	74	Patrick Gannon,	40			Pine Ridge,	Plains township,
14	75	John Turner,	19			Prospect shaft,	Plains township,
14	76	John Deitz,	16			Prospect shaft,	Plains township,
15	77	John Hawker,	28			No. 9 breaker,	Sugar Notch,
19	78	Joseph Ginnard,	11			No. 2 breaker,	Nanticoke,
21	79	Ambrose Griffin,	25			Baltimore slope,	Plains township,
		Total,		38	110		

Continued.

Remarks on the Causes of the Accident.	CAUSES OF THE ACCIDENTS.								Number of accidents.
	Explosion of CH4 gas.	Falling of roof & coal.	Falling down shafts.	Crushed by mine cars	Explosion of powder and blasts.	Miscellaneous under ground	On surface.	Totals.	
Instantly killed by a fall of coal,		1						1	44
Fatally injured by coal falling and rolling down a heavy pitch upon him. He died while being taken home,		1						1	45
Injured by barring down top coal. He fell off his support, and the coal came down and rolled upon him, injuring him so that he died August 7,		1						1	46
Leg severely cut by slipping under a culm car, and died Aug. 11,							1	1	47
He was fire boss, and was severely burned by explosion of gas while making his morning examination. He carried naked light and a safety lamp. Met gas where he did not expect any, and exploded it; he died August 18,	1							1	48
Fatally kicked by a mule, and died at the hospital August 15,						1		1	49
Instantly killed by a fall of top coal in a gangway,		1						1	50
Fatally injured by falling under cars. Died at 7, P. M., the same day,				1				1	51
Hip dislocated and collar bone broken by a premature blast. Died at the Wilkes-Barre hospital September 9,					1			1	52
Instantly killed by coal rushing down the breast and crushing him inside of the battery. They had to load two hundred cars of coal to find his body,						1		1	53
Struck down by loaded cars while repairing the track near the breaker and was fatally injured. He died the same day,							1	1	54
Fatally scalded by a boiler explosion, and died September 23, 1881,							1	1	55
Killed by a premature blast in the bottom rock,					1			1	56
Fell down the slope on a pitch of 60°, and was instantly killed,			1					1	57
His knee was jammed between two loaded cars, and the shock was such, that he died within a few minutes,							1	1	58
Instantly killed by a large piece of rock falling upon him,		1						1	59
Instantly killed by falling off a platform into the shaft,			2					1	60
Stepped off the cage when within thirty-three feet to the bottom of the shaft, and was killed,			1					1	61
Severely burned by an explosion of gas, and died from his injuries October 29,	1							1	62
Instantly killed by a fall of top coal while returning immediately after blasting,		1						1	63
Instantly killed by a fall of top coal immediately after firing a blast,		4						1	64
Instantly killed by a fall of bone coal in a cross-heading,		1						1	65
Fatally injured by returning too soon to a supposed missed shot, which exploded when he was close to it. Died early next morning,					1			1	66
Fatally crushed by cars at the foot of the shaft; died the same night,				1				1	67
Instantly killed by a prop falling upon him,						1		1	68
Skull fractured by starting the air compressor off the center without shutting the steam off. Died November 21,							1	1	69
Cuts on his head and body by a fall of bone coal. Died Nov. 30,		1						1	70
Severely burned by an explosion of gas, and died December 17,	1							1	71
Burned by an explosion of CH4 gas. Died December 13, 1881,	1							1	72
Slipped on to the main screen by sliding down a chute, and was crushed to death before he was discovered,							1	1	73
Foot crushed by a fall of coal, which was afterwards amputated at the hospital. He died from delirium tremens December 18,		1						1	74
Were both fatally burned by an explosion of CH4 gas, and died shortly after, the same day,	1							1	75
	1							1	76
Killed by crossing a gravity track, when an empty culm car struck him down and ran over him,							1	1	77
Fatally injured by falling off the steps when going up the breaker. He fell a height of ten feet, and landed upon the floor of the engine-house, and died the same night,							1	1	78
Instantly killed by a fall of coal when robbing a pillar,		1						1	79
Totals,	10	28	3	10	7	3	18	79	

TABLE No. 5.—*Showing the number of days worked, number of persons employed, persons injured, and persons killed; together with ratio of employés to the number killed and injured, and tons of coal mined per employé, per life lost, and total tonnage per each colliery; number of mules and horses and number of keys of powder used for all purposes, during 1881.*

LEHIGH VALLEY COAL COMPANY.

Names of the Collieries.	Days worked by breaker.	Number of persons employed.	Persons injured.	Persons killed.	Ratio of employees to each person killed and injured.	Tons of coal mined per employee.	Tons of coal mined per life lost.	Tons of coal mined during 1881.	Number of mules and horses.	Kegs of powder used for all purposes in the mines.
1. Exeter Shaft,	218.10	429	3	3	71.5	487.17	67,323	209,000	68	6,793
2. Prospect,	231.10	504	8	4	42	405.21	56,056.75	224,227	58	7,206
3. Mineral Spring,	195.30	201	4	None	50.2	397.66	No life lost.	79,930.09	25	2,400
4. Midvale,	207.80	154	1	1	77	362.39	55,808	55,808	7	1,943
5. Henry,	220.95	262	4	2	43.6	469.22	61,468.53	122,937.06	46	3,461
Total Lehigh Valley Coal Company,	*214.65	1,550	20	10	51.6	446.38	69,190.21	691,902.15	204	21,803

LEHIGH AND WILKES-BARRE COAL COMPANY.

6. Diamond,	191.60	304	5	5	30.4	589.52	35,843.21	179,216.05	41	3,564
7. Hollenback,	237.15	504	11	4	33.6	472.32	59,512.76	238,051.04	34	5,110
8. Empire,	229.05	729	11	3	52	422.88	102,760.66	308,282.00	64	6,421
9. Hartford,	231.20	567	6	4	56.7	375.93	53,288.76	213,155.03	47	5,420
10. Sugar Notch Shaft,	222.15	557	2	1	185.6	299.46	166,802.01	166,802.01	58	5,427
11. Sugar Notch Slope,	209.95	503	6	2	62.8	267.17	67,194.09	134,388.19	39	5,128
12. Lance, No. 11.										
13. Nottingham,	235.50	956	7	1	119.5	388.28	371,198.17	371,198.17	75	8,875
14. Reynolds,	242.55	427	2	3	85.4	379.79	54,057.72	162,173.17	54	3,556
15. Wanamie,	197.40	394	3	1	98.5	308.06	121,377.02	121,377.02	43	5,214
Total Lehigh and Wilkes-Barre Coal Company,	*221.84	4,941	53	24	64.1	383.65	78,943.44	1,894,642.68	455	48,715

DELAWARE AND HUDSON CANAL COMPANY.

16. Mill Creek,	243.25	325	2	3	65	508.56	55,094.19	165,283.19	45	Not given.
17. Pine Ridge,	247.25	237	3	1	64.25	529.73	135,612.18	135,612.18	36	Not given.
18. Laurel Run,	251.00	273	2	1	91	601.36	164,174	164,174	41	Not given.

19. Baltimore Slope,	236.25	245	. .	3	81.6	420.36	34,330	102,990	23	Not given.
20. Baltimore Tunnel,	245	252	2	. . .	126	573.35	No life lost.	144,485	31	Not given.
21. Connyngham,	111.25	197	1	.	197	196.82	No life lost.	38,775	15	Not given.
22. No. 2 Plymouth,	208.75	304	2	2	76	408.80	62,138.52	124,277.05	34	Not given.
23. No. 3 Plymouth,	189.50	288	2	1	96	693.78	199,811	199,811	31	Not given.
24. No. 4 Plymouth,	188.25	233	. .	1	233	434.70	101,287	101,287	18	Not given.
25. No. 5 Plymouth,	241	325	. .	1	325	628.97	204,415.35	204,415.35	53	Not given.
Total Delaware and Hudson Canal Company,	*216.15	2,699	14	13	99.9	515.41	106,239.21	1,381,109.77	330	

SUSQUEHANNA COAL COMPANY.

26. Breaker, No. 1,	255.20	418							50	
27. Breaker, No. 2,	245.75	999	28	11	53.3	368.8	69,704.53	766,749.9	10	19,933
28. Breaker, No. 5,	270.65	662							89	
29. Grand Tunnel, No. 3,	214.70	262	4	1	52.4	327.96	85,926.95	85,926.95	28	2,310
Total Susquehanna Coal Company,	*246.57	2,341	32	12	53.2	364.23	71,056.40	852,676.85	267	22,243

MISCELLANEOUS COAL COMPANIES.

30. Avondale,	230.25	367	3	2	73.4	460.46	84,494.57	168,989.15	38	4,215
31. Boston,	235.80	232	1	1	116	455	105,561.03	105,561.03	37	2,764
32. Warrior Run,	149.50	226	1	. . .	226	265.48	No life lost.	60,000	16	1,500
33. No. 1 Shaft, Kingston,	242	212	2	.	106	666.03	No life lost.	141,199.10	31	3,455
34. No. 2 Shaft, Kingston,	245.20	313	4	1	62.6	807.94	252,887.19	252,887.19	34	5,764
35. Gaylord,	266	349	3	4	49.8	467.07	40,752.54	163,010.16	45	4,780
36. Franklin,	208.50	445	4	3	63.5	326.35	48,409.71	145,229.15	24	3,463.5
37. Wyoming,	243.20	428	5	. . .	85.6	501.10	No life lost.	214,475	42	5,444
38. Forty Fort,	227.45	291	1	1	145.5	385.91	112,331	112,331	38	4,440
39. Enterprise,	219.60	326	5	. . .	65.2	423.09	No life lost.	137,930.07	37	4,445
40. East Boston,	192.30	238	4	. . .	59.5	470.58	No life lost.	112,000	25	
41. Black Diamond,	207.40	281	. . .	1	281	301.71	84,783.15	84,783.15	34	3,600
42. Maltby,	236.00	304	1	. . .	304	324.13	No life lost.	98,538	46	3,088
43. Albright Coal Company,	75.25	111	No	one	injured.	115.59	No life lost.	12,831	13	Not given.
44. Red Ash Coal Company,	227.00	259	7	1	32.3	357.52	92,599.16	92,599.16	26	3,994
45. Raubville,	207.50	143	No	one	injured.	285.10	No life lost.	40,770.6	10	1,300
46. Dodson,	244.80	206	1	1	103	478.87	98,648	98,648	20	3,040
47. Salem,	280.00	153	2	1	51	342.81	52,450	52,450	24	1,680
48. Hillman,	244.80	110	2	. .	55	472.72	No life lost.	52,000	9	1,600
49. Chauncey,	206.00	57	1	. . .	57	430.08	No life lost.	24,515	7	730
50. Hollenbeck, R. S. Poole,	176.00	50	No	one	injured.	389.00	No life lost.	19,450.19	9	248
51. Lehigh and Luzerne Coal Company,	27.00	176	No	one	injured.	68.38	No life lost.	10,980.19	8	200
Total miscellaneous coal companies,	*208.70	5,277	47	16	83.7	417.12	137,573.56	2,201,176.95	573	59,750.5
Grand total,	*221.58	16,808	166	75	69.7	417.74	93,620.11	7,021,508.40	1,829	152,511.5

* Average.

TABLE 5—*Continued.*

RECAPITULATION.

NAMES OF THE COLLIERIES.	Days worked by breaker.	Number of persons employed.	Persons injured.	Persons killed.	Ratio of employees to each person killed and injured.	Tons of coal mined per employee.	Tons of coal mined per life lost.	Total tons of coal mined during 1881.	Number of mules and horses.	Kegs of powder used for all purposes in the mines.
Lehigh Valley Coal Company,	214.65	1,550	20	10	51.6	446.38	69,190.21	691,902.15	204	21,803
Lehigh and Wilkes-Barre Coal Company,	221.84	4,941	53	24	64.1	383.65	78,943.44	1,894,642.68	455	48,715
Delaware and Hudson Coal Company,	216.15	2,699	14	13	99.9	515.41	106,239.21	1,381,109.77	330	Not given.
Susquehanna Coal Company,	246.57	2,341	32	12	53.2	364.23	71,056.40	852,676.85	267	22,243
Miscellaneous Coal Companies,	208.70	5,277	47	16	83.7	417.12	137,573.56	2,201,176.95	573	59,750.5
Total of all coal companies,	*221.58	16,808	166	75	69.7	417.74	93,620.11	7,021,508.40	1,829	152,511.5

* Average.

In addition to the above there were four men seriously injured and four killed in new shafts, adding which would give a total of 170 injured and 79 killed, reducing the production of coal per life lost to 88,879.85 tons. These casualties occurred in shafts that were in progress of sinking and were not producing coal, therefore are not included in the above table. There were about 282 persons employed sinking these new shafts, which are also not included in the above table.

TABLE No. 6.—*Showing tons of coal mined, number of persons employed, lives lost, and tons of coal mined per life lost, for each year, from 1871 to 1881, included.*

YEARS.	Tons of coal mined each year.	Average number of persons employed.	CLASSIFICATION OF FATAL ACCIDENTS UNDERGROUND.							Total lives lost.	Tons of coal mined per life lost.
			Explosions of C H, gas.	Falling of roof and coal.	Falling down shafts.	Crushed by mine cars.	Explosions of powder and blasts.	Miscellaneous.	On surface.		
1871,	3,000,000	9,870	1	13	2	6	1	24	6	53	56,000
1872,	3,250,000	9,807	8	15	3	7	. . . . .	4	3	40	81,560
1873,	4,232,000	11.325	6	11	3	13	4	. . . . .	9	46	92,000
1874,	4,513,847	13,576	9	17	3	9	5	7	7	57	80,000
1875,	4,261,263	15,008	6	19	14	5	10	1	8	63	67,629
1876,	4,615,386	14,317	7	23	1	4	13	4	3	55	83,916
1877,	4,080,377	14,073	1	25	2	1	4	3	2	38	107,377
1878,	4,082,372	13,045	7	14	. . . . .	5	4	3	3	36	113,399
1879,	6,310,256	15,582	12	30	. . . . .	15	5	1	2	65	97,080
1880,	5,708,813	15,987	8	11	1	12	2	7	7	51	111,937
1881,	7,021,508	16,808	10	28	3	10	7	3	18	79	88,879
Total of eleven years,	51,075,822	*13,581	75	206	35	87	55	57	68	583	87,608.78

TABLE No. 7.—*The number of each class of employés at each colliery during the year 1881.*

LEHIGH VALLEY COAL COMPANY.

NAMES OF THE COLLIERIES.	NUMBER OF PERSONS EMPLOYED INSIDE.							NUMBER OF PERSONS EMPLOYED OUTSIDE.							Grand totals inside and outside.
	Bosses.	Miners.	Laborers.	All company men.	Drivers and runners.	Door boys	Totals inside.	Bosses.	Mechanics.	Head and plate men.	All company men.	Drivers and runners.	Slate pickers	Totals outside.	
Exeter,	1	100	75	36	57	27	296	1	7	8	43	6	68	133	429
Prospect,	2	111	102	45	62	20	342	1	5	7	70	6	73	162	504
Mineral Spring,	1	45	30	15	29	5	125	1	12	7	13	5	38	76	201
Midvale,	1	35	30	11	13	5	95	1	2	3	20	1	32	59	154
Henry,	1	67	30	25	58	18	199	1	4	5	30	1	22	63	262
Total, Lehigh Valley Coal Company,	6	358	267	132	219	75	1 057	5	30	30	176	19	233	493	1,550

LEHIGH AND WILKES-BARRE COAL COMPANY.

Diamond,	1	60	50	31	42	20	204	1	6	10	53	7	23	100	304
Hollenback,	1	100	105	49	38	30	323	1	3	20	54	5	98	181	504
Empire,	1	175	160	90	70	42	538	1	8	17	56	4	105	191	729
Hartford,	1	120	140	44	27	24	356	1	10	15	39	7	139	211	567
Sugar Notch shaft,	1	135	125	52	35	35	383	3	8	20	35	8	100	174	557
Sugar Notch slope,	1	130	95	57	35	30	348	3	12	15	25	10	90	155	503
Nottingham,	2	250	150	179	78	21	680	3	5	20	38	. .	210	276	956
Reynolds,	2	100	65	68	40	15	290	3	3	7	30	8	86	137	427
Wanamie,	1	110	70	25	26	16	248	1	7	13	25	8	92	146	394
Total, Lehigh and Wilkes-Barre Coal Company,	11	1,180	960	595	391	233	3,370	17	62	137	355	57	943	1,571	4,941

DELAWARE AND HUDSON CANAL COMPANY.

Mill Creek,	1	87	27	27	60	16	218	1	8	8	35	5	50	107	325
Pine Ridge,	1	54	40	20	34	11	160	1	7	4	28	3	54	97	257
Laurel Run,	1	81	30	16	44	16	188	1	6	10	16	4	48	85	273

Baltimore slope,	1	50	25	33	18	8	135	1	7	8	27	6	61	110	245
Baltimore tunnel,	1	44	46	21	18	6	136	1	12	7	34	2	60	116	252
Conyngham,	1	28	28	22	10	6	95	1	6	7	36	2	50	102	197
No. 2 Plymouth,	1	74	44	43	40	8	210	1		5	24	2	62	94	304
No. 3 Plymouth,	1	74	43	34	35	17	204	1	5	4	17	2	55	84	288
No. 4 Plymouth,	1	70	12	25	24	15	147	1	6	9	26	2	42	86	233
No. 5 Plymouth,	1	95		55	40	20	211	1	6	10	33	4	60	114	325
Total, Delaware and Hudson Canal Company,	10	657	295	296	323	123	1,704	10	63	72	276	32	542	995	2,699

SUSQUEHANNA COAL COMPANY.

Breaker No. 1,	2	57	45	25	29	12	170	1	30	15	100	16	86	248	418
Breaker No. 2,	5	225	255	87	87	39	698	1	11	23	74	6	186	301	999
Breaker No. 5,	2	133	170	50	60	33	448	1	20	15	56	4	118	214	662
Grand tunnel, No. 3,	1	46	39	19	15	9	129	1	11	6	26	3	86	133	262
Total, Susquehanna Coal Company,	10	461	509	181	191	93	1 445	4	72	59	256	29	476	896	2.341

MISCELLANEOUS COAL COMPANIES.

Avondale,	1	89	93	27	24	10	244	1	10	7	24	4	77	123	367
Boston,	1	50	45	13	25	8	142	1	10	9	23	7	40	90	232
No 1 shaft, Kingston,	2	60	30	10	23	7	132	2	6	3	10	4	55	80	212
No. 2 shaft, Kingston,	2	80	60	8	24	19	193	6	20	16	24	1	53	120	313
Gaylord,	1	80	70	25	35	17	228	1	14	5	13	2	86	121	349
Franklin,	2	75	80	38	23	20	238	1	14	17	89	6	80	207	445
Wyoming,	2	92	74	59	53	21	301	1	14	9	26	7	70	127	428
Forty Fort,	1	85	30	35	25	20	197	1	8	10	30	5	40	91	291
Enterprise,	2	67	65	50	39	25	248	2	6	5	19	4	42	78	326
East Boston,	1	60	40	25	30	8	161	1	3	7	20	4	39	74	238
Black Diamond,	2	72	40	19	31	10	174	3	6	5	17	7	69	107	281
Maltby,	4	74	50	38	28	6	200	2	9	5	34	2	52	104	304
Albright,	1	36	16	5	5	3	66	1	8	5	7	4	20	45	111
Dodson,	1	45	45	35	16	7	149	1	6	8		2	40	57	206
Red Ash,	1	83	39	9	26	15	173	2	7	7	25	2	43	86	259
Raubville,	1	38	7	2	8	4	60	3	4	7	30	4	35	83	143
Chauncey,	1	14	14	2	5	2	38	1	2	1	3	1	11	19	57
Salem,	2	37	37	8	10	3	97		2	4	9	6	35	56	153
Hillman,	1	32	35	5	4	3	80	1	2	4	10	3	10	30	110
R. S. Poole's, Hollenback,	1	10	10	1	3		25	1	4	2	6	2	10	25	50
Warrior Run,	1	70	35	12	10	16	144	1	8	7	20	4	42	82	226
Lehigh-Luzerne Coal Company,	2	32	44	9	7	1	95	1	3	12	30	1	34	81	176
	33	1 281	959	435	455	225	3,388	34	166	155	469	82	983	1,889	5,277

TABLE No. 7—*Continued.*

RECAPITULATION.

NAMES OF THE COLLIERIES.	NUMBER OF PERSONS EMPLOYED INSIDE.							NUMBER OF PERSONS EMPLOYED OUTSIDE.							Grand totals inside and outside.
	Bosses.	Miners.	Laborers.	All company men.	Drivers and runners.	Door boys.	Totals inside.	Bosses.	Mechanics.	Head and plate men.	All company men.	Drivers and runners.	Slate pickers.	Totals outside.	
Lehigh Valley Coal Company,	6	378	267	132	219	75	1,057	5	30	30	176	19	233	493	1,550
Lehigh and Wilkes-Barre Coal Company,	11	1,180	960	595	391	233	3 370	17	62	137	355	57	943	1 571	4 941
Delaware and Hudson Canal Company,	10	657	295	296	323	123	1,704	10	63	72	276	32	542	995	2,699
Susquehanna Coal Company,	10	461	509	181	191	93	1,445	4	72	59	256	29	476	896	2 341
Miscellaneous coal companies,	33	1,281	959	435	455	225	3 388	34	166	155	469	82	983	1,889	5,277
Total of all coal companies,	70	3,937	2,990	1,639	1,579	749	10,964	70	393	453	1,532	219	3 177	5,814	16,808

TABLE No. 8.—*Showing the number of days worked by each breaker at every colliery and for each month during 1881.*

LEHIGH VALLEY COAL COMPANY.

NAMES OF THE COLLIERIES.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
Exeter,	12.75	18.50	17.25	14.70	16.70	16.90	18.90	21.30	19.65	22.00	20.90	18.55	218.10
Prospect,	12.95	15.75	17.65	14.55	15.25	19.05	22.00	22.60	21.80	25.30	23.00	21.00	231.10
Mineral Spring,	12.40	13.10	16.95	12.35	13.05	17.20	19.70	19.05	15.75	17.50	21.75	16.50	195.30
Midvale,	13.20	13.65	19.30	13.30	13.60	16.80	18.60	19.80	19.70	20.40	18.30	21.15	207.80
Henry,	12.35	15.30	18.90	14.90	14.35	18.65	22.15	20.70	21.25	23.65	23.65	15.10	220.95

LEHIGH AND WILKES-BARRE COAL COMPANY.

Diamond,	11.00	19.35	20.00	14.60	15.20	17.00	18.50	18.85	17.95	18.65	13.00	8.10	191.60
Hollenback,	14.50	21.60	21.50	14.30	15.30	19.30	21.70	23.25	22.40	22.90	21.45	18.95	237.15
Empire,	14.25	20.10	20.90	15.00	15.25	19.10	21.60	20.80	20.50	21.25	20.75	19.55	229.05
Hartford,	14.90	18.30	19.30	14.60	15.80	16.70	17.30	24.50	23.90	24.70	21.50	19.70	231.20
Sugar Notch, No. 9,	15.00	18.75	17.50	14.00	15.00	18.70	20.60	20.20	22.50	21.85	19.45	18.60	222.15
Sugar Notch, No. 10,	14.50	16.75	16.30	13.30	14.60	18.90	18.20	18.45	19.95	21.85	20.15	17.00	209.95
Nottingham,	15.00	21.00	20.70	15.00	16.50	20.00	19.90	22.80	21.05	22.80	20.10	20.65	235.50
Wanamie,	14.10	15.90	14.75	11.60	11.50	18.00	17.55	18.20	19.20	19.95	19.00	17.65	197.40
Reynolds,	13.50	20.30	20.30	15.00	16.40	19.60	22.50	23.05	23.75	24.75	22.65	20.75	242.55

DELAWARE AND HUDSON CANAL COMPANY.

Mill Creek,	13.25	21.75	18.25	11.75	15.75	18.50	22.75	26.00	21.75	24.50	23.00	23.00	243.25
Pine Ridge,	13.00	20.50	20.50	14.75	15.75	19.00	22.00	26.50	24.75	24.50	23.25	22.75	247.25
Laurel Run,	12.25	20.25	20.00	15.00	16.75	20.00	22.75	26.50	24.25	25.75	24.25	23.25	251.00
Baltimore slope,	13.00	18.75	17.75	15.00	16.50	19.00	22.50	25.25	23.00	22.75	21.50	21.25	236.25
Baltimore tunnel,	12.75	20.75	19.50	15.00	17.00	20.00	22.75	25.25	20.50	25.75	23.75	22.00	245.00
Conyngham,								15.75	24.25	25.75	22.25	23.25	111.25
No. 2, Plymouth,	12.00	16.00	17.00	11.25	13.25	15.50	19.50	22.75	20.00	21.00	20.75	19.75	208.75
No. 3, Plymouth,	10.00	17.75	14.75	9.50	10.50	12.75	16.00	21.25	20.50	21.25	17.25	18.00	189.50
No. 4, Plymouth,	10.50	3.75	17.75	13.00	11.00	17.75	17.75	21.75	16.75	19.75	20.25	18.25	188.25
No. 5, Plymouth,	13.25	20.25	19.00	13.00	15.00	19.75	22.50	26.75	24.00	24.75	23.50	22.25	241.00

SUSQUEHANNA COAL COMPANY.

Breaker, No. 1,	19.75	20.25	21.25	17.50	22.50	16.50	23.00	20.00	22.75	24.25	24.70	22.75	255.20
Breaker, No. 2,	17.50	15.50	15.25	22.50	22.50	22.75	22.50	15.50	24.00	25.25	23.75	18.75	245.75
Breaker, No. 5,	20.50	20.50	20.25	23.75	22.75	26.00	24.00	14.50	24.50	25.90	24.25	23.75	270.65
Grand tunnel, No. 3,	17.70	13.50	14.70	19.10	18.00	15.25	20.00	15.25	19.10	19.50	22.10	20.50	214.70

TABLE No. 8—*Continued.*

MISCELLANEOUS COAL COMPANIES.

NAMES OF THE COLLIERIES.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
Avondale,													230.25
Boston,													235.80
No. 1 shaft, Kingston,	18.30	19.50	18.10	18.20	19.00	24.30	24.30	22.00	14.10	21.60	20.60	22.00	242.00
No. 2 shaft, Kingston,	15.20	21.30	21.00	14.60	16.20	23.80	23.00	24.40	16.00	21.50	23.90	24.30	245.20
Gaylord,	23.00	17.00	20.30	19.00	21.40	23.40	21.75	25.00	23.00	23.75	24.50	23.90	266.00
Franklin,	12.25	13.50	19.00	15.00	15.00	18.50	18.00	16.00	16.75	20.50	21.50	22.50	208.50
Warrior Run,	12.00	12.00	1.00	3.00	13.50	14.00	15.50	18.50	19.00	20.00	21.00		149.50
Wyoming,	15.20	18.80	18.30	15.00	15.70	19.10	21.80	26.10	22.10	23.60	24.00	23.50	243.20
Forty Fort,	13.90	15.30	17.30	13.90	14.60	16.75	20.60	22.30	22.10	24.30	23.60	22.80	227.45
Enterprise,	14.25	13.90	17.05	14.60	12.80	18.00	19.00	21.60	21.10	22.20	23.60	21.50	219.60
East Boston,	13.70	15.40	14.40		14.10	16.40	17.60	16.20	19.20	22.10	21.80	21.40	192.30
Black Diamond,	13.90	17.30	17.30	12.65	14.80	15.25	16.50	20.40	20.05	19.80	18.95	20.50	207.40
Maltby,	15.00	21.00	16.00	15.00	17.00	18.00	22.00	20.00	19.00	24.00	24.00	25.00	236.00
Albright Coal Company,									10.00	22.00	21.00	22.25	75.25
Red Ash Coal Company,	14.90	19.70	17.90	14.50	15.90	18.80	20.25	22.50	21.30	22.70	20.00	18.60	227.00
Raubville,	15.00	17.00	14.50	16.00	15.00	18.50	16.50	17.00	19.00	20.00	19.50	19.50	207.50
Dodson,	15.05	20.35	20.55	12.55	15.25	19.50	20.80	23.60	24.40	25.10	23.75	23.90	244.80
Salem,													280.00
Hillman,	13.25	15.75	21.00	16.00	15.50	19.90	23.50	23.40	21.40	25.00	25.50	24.60	244.80
Chapman,	12.00	16.50	15.00	16.00	17.00	20.00	15.50	22.00	19.00	17.00	20.00	16.00	206.00
Hollenback,	15.00	16.00	16.00	13.00	12.00	18.00	13.00	20.00	18.00	13.00	9.00	13.00	176.00
Lehigh-Luzerne Coal Company,											5.00	22.00	27.00

TABLE No. 9.—*Showing number and horse-power of each class of engines, and number of steam boilers at each colliery for 1881.*

LEHIGH VALLEY COAL COMPANY.

NAMES OF THE COLLIERIES.	Number of hoisting engines.	Horse-power.	Number of breaker engines.	Horse-power.	Number of pumping engines.	Horse-power.	Number of fan engines.	Horse-power.	Number of donkey pumps.	Horse-power.	Number of mine locomotives.	Horse-power.	Total number of engines	Total horse-power of engines.	Number of steam boilers.
1. Exeter,	5	390	1	65	1	200	2	120	1	10	1	40	11	825	16
2. Prospect,	8	635	1	75	. . .	. . .	3	225	. . .	. . .	1	40	13	960	28
3. Mineral Spring,	4	134	1	50	1	70	1	40	3	110	. . .	. . .	10	404	8
4. Midvale,	2	95	1	35	. . .	. . .	1	30	1	40	. . .	. . .	5	200	6
5. Henry,	6	500	1	35	. . .	. . .	1	40	6	300	. . .	. . .	14	875	15
Total Lehigh Valley Coal Company,	25	1,754	5	260	.	270	8	455	11	460	2	80	53	3,264	73

LEHIGH AND WILKES-BARRE COAL COMPANY.

6. Diamond,	4	400	2	140	3	336	2	140	3	42	1	35	15	1,093	39
7. Hollenback,	4	400	1	80	1	400	2	180	2	60	. . .	. . .	10	1,120	18
8. Empire,	7	350	2	85	2	450	4	80	4	24	2	60	21	1,049	36
9. Hartford,	5	388	2	80	2	246	2	80	3	130	2	70	16	994	25
10. Sugar Notch Shaft,	4	200	2	65	1	80	1	20	2	60	. . .	. . .	10	425	15
11. Sugar Notch Slope,	4	280	2	120	2	240	2	80	2	10	. . .	. . .	12	730	19
12. Lance,	2	100	1	50	1	120	1	20	3	105	. . .	. . .	8	395	9
13. Nottingham,	4	290	1	60	1	80	1	80	4	130	2	65	13	705	21
14. Reynolds,	2	50	1	50	. . .	. . .	3	100	. . .	. . .	. . .	. . .	6	200	10
15. Wanamie,	3	180	1	50	1	175	1	20	1	40	. . .	. . .	7	465	11
Total Lehigh and Wilkes-Barre Coal Co.,	39	2,638	15	780	14	2,127	19	800	24	601	7	230	118	7,176	203

DELAWARE AND HUDSON CANAL COMPANY.

16. Mill Creek,	4	296	1	36	. . .	. . .	2	202	4	133	. . .	. . .	11	667	20
17. Pine Ridge,	3	237	1	37	. . .	. . .	1	49	8	237	. . .	. . .	13	560	15
18. Laurel Run,	2	117	1	45	. . .	. . .	2	98	4	78	. . .	. . .	9	338	9
19. Baltimore Slope,	4	220	1	71	. . .	. . .	1	54	. . .	. . .	. . .	. . .	6	345	11
20. Baltimore Tunnel,	3	160	1	37	. . .	. . .	2	117	6	320	1	30	13	664	27
21. Conyngham,	3	200	1	62	1	200	1	49	1	25	. . .	. . .	7	536	12

TABLE No. 9—*Continued.*

DELAWARE AND HUDSON CANAL COMPANY—Continued.

NAMES OF COLLIERIES.	Number of hoisting engines.	Horse-power.	Number of breaker engines.	Horse-power.	Number of pumping engines.	Horse-power.	Number of fan engines.	Horse-power.	Number of donkey engines.	Horse-power.	Number of mine locomotives.	Horse-power.	Total number of engines.	Total horse-power of engines.	Number of steam-boilers.
22. No. 2 Plymouth,	5	270	1	35	2	154	2	55	3	133	....	....	13	647	21
23. No. 3 Plymouth,	2	120	1	35	1	300	1	60	1	3	....	....	6	518	12
24. No. 4 Plymouth,	4	180	1	30	2	125	1	45	1	1	....	....	9	381	12
25. No. 5 Plymouth,	4	150	1	35	1	60	2	70	3	110	1	30	12	455	9
Total Delaware and Hudson Canal Co.,	34	1,950	10	423	7	839	15	799	31	1,040	2	60	99	5,111	148

SUSUQEHANNA COAL COMPANY.

26. No. 1 Breaker,	2	230	2	80	1	45	1	100	1	30	1	40	8	525	20
27. No. 2 Breaker,	6	915	1	80	1	55	4	320	3	165	5	220	20	1,755	35
28. No. 3 Breaker,	2	240	1	100	1	30	1	15	1	15	....	....	6	400	15
29. No. 5 Breaker,	7	1,200	1	80	1	210	3	140	1	20	1	60	14	1,710	30
Total Susquehanna Coal Company,	17	2,585	5	340	4	340	9	575	6	230	7	320	48	4,390	100

MISCELLANEOUS COAL COMPANIES.

30. Avondale,	3	170	1	60	1	90	1	50	4	120	....	....	10	490	16
31. Boston,	2	80	1	50	....	....	1	25	3	110	....	....	7	265	12
32. No. 1, Kingston,	2	121	1	31	1	97	....	....	2	20	....	....	6	269	18
33. No. 2, Kingston,	3	617	1	197	1	30	2	80	6	60	2	50	15	1,034	27
34. Gayford,	10	1,732	1	140	1	100	2	125	3	140	....	....	17	2,237	21
35. Franklin,	4	410	1	30	2	125	3	90	1	15	1	15	12	685	22
36. Wyoming,	5	276	1	51	....	....	2	60	2	14	....	....	10	401	12
37. Forty Fort,	3	100	1	50	....	....	2	36	2	14	....	....	8	200	11
38. Enterprise,	2	144	1	30	3	40	2	23	....	....	....	....	8	237	11
39. East Boston,	4	180	1	60	....	....	1	30	4	....	....	....	10	270	15
40. Black Diamond,	2	80	1	50	2	125	1	30	....	....	....	....	6	285	13
41. Albright Coal Company,	....	....	1	80	....	....	1	40	....	....	....	....	2	120	12
42. Maltby,	4	150	1	50	....	....	1	20	....	....	....	....	6	220	26

43. Raubville,			2	80			1	30	1	10			4	120	6
44. Dodson,	2	90	1	50	1	750	1	35	1				6	925	9
45. Warrior Run,	3		1		2		2		1				9		17
46. Red Ash,	1	40	1	30									2	70	3
47. Salem,			1	40					2	15			3	55	2
48. Hillman,	1	20	1	20			1	15	4	50			7	105	6
49. Lehigh-Luzerne Coal Company,	1	30	1	20	1	10					1	40	4	100	6
50. Chauncey,			1	25									1	25	2
51. Pooles, R. S.,	1	25	1	20					1	15			3	60	2
	53	4,265	23	1,164	15	1,367	24	689	37	583	4	105	156	8,173	269

RECAPITULATION.

Lehigh Valley Coal Company,	25	1,754	5	260	2	270	8	455	11	460	2	80	53	3,264	73
Lehigh and Wilkes-Barre Coal Company,	39	2,638	15	780	14	2,127	19	800	24	601	7	230	118	7,176	203
Delaware and Hudson Canal Company,	34	1,950	10	423	7	839	15	799	31	1,040	2	60	99	5,111	148
Susquehanna Coal Company,	17	2,585	5	340	1	340	9	575	6	230	7	320	48	4,390	100
Miscellaneous coal companies,	53	4,265	23	1,164	15	1,367	24	689	37	583	4	105	156	8,173	269
Grand total,	168	13,192	58	2,967	42	4,943	75	3,318	109	2,914	22	795	474	28,114	793

TABLE No. 10.—*Showing the state of ventilation in all the collieries op-*

NAMES OF COLLIERIES.	Total cubic feet of air per minute at the inlet.	CUBIC FEET OF AIR PER MINUTE PASS FACE IN EACH SPLIT.				
		No. 1.	No. 2.	No. 3.	No. 4.	No. 5.
Exeter shaft,	136,675	18,302	14,462	19,650	13,284	14,180
Prospect shaft,	156,462	9,534	18,045	16,975	20,617	19,591
Oakwood shaft,	118,276	25,652	20,796	18,439	12,573	6,637
Mineral Spring slope,	103,375	10,375	14,000	27,000	....	....
Midvale slope,	29,100	10,581	8,856	....	....	....
Henry shaft,	122,421	18,822	15,552	19,385	12,617	....
Baltimore slope,	86,843	14,900	29,040	41,800	16,380	....
Mill Creek slope,	137,177	9,575	16,625	12,325	13,275	13,425
Laurel Run slope,	138,225	6,472	7,081	53,292	6,677	5,665
Pine Ridge shaft,	56,000	23,475	5,895	12,995	13,317	....
Baltimore tunnel,	160,000	21,840	16,120	9,600	....	....
Conyngham shaft,	71,760	27,462	9,500	17,950	8,875	....
No. 2 Shaft, Plymouth,	59,585	27,801	17,950	....	....	....
No. 3 Shaft, Plymouth,	40,833	18,511	20,262	....	....	....
No. 4 Shaft, Plymouth,	50,482	19,110	17,687	....	....	....
No. 5 Shaft, Plymouth,	101,850	4,125	4,875	7,200	15,600	24,925
Hollenback shaft,	217,890	36,470	36,835	20,785	35,997	27,897
Diamond shaft,	162,350	37,300	8,875	21,475	14,975	75,000
Empire shaft,	Not meas'd.	20,000	28,687	19,525	13,950	20,687
Hartford slope,	69,910	10,200	9,280	10,215	12,395	6,445
Hartford new slope,	56,433	8,412	6,607	12,350	11,650	....
Sugar Notch shaft,	63,050	14,252	11,667	12,295	17,300	5,778
Sugar Notch slope,	46,800	20,500	10,125	9,525	....	....
Nottingham shaft,	91,275	21,050	19,375	8,375	17,850	14,250
Reynold's Slope, No. 16,	90,280	17,425	18,450	18,345	18,375	....
Wanamie slope,	54,587	20,833	19,295	....	....	....
No. 1 Slope, Nanticoke,	56,050	13,377	13,135	17,124	....	....
No. 2 Slope, Nanticoke,	78,750	25,250	34,500	....	....	....
No. 4 Slope, Nanticoke,	119,837	38,737	64,875	....	....	....
No. 1 Shaft, Nanticoke,	83,160	16,250	16,125	22,500	18,700	....
No. 2 Shaft, Nanticoke,	53,659	20,136	18,160	....	....	....
Tunnel No. 2, Nanticoke,	25,000	17,000	....	....	....	....
Tunnel No. 4, Nanticoke,	14,565	8,898	....	....	....	....
Honey Pot Tunnel, Nanticoke,	15,660	7,100	....	....	....	....
Grand Tunnel, Nanticoke,	21,428	15,121	4,520	....	....	....
Avondale shaft,	76,796	14,950	12,329	10,000	21,806	8,200
Boston shaft,	53,237	22,575	23,912	....	....	....
Enterprise shaft,	48,475	6,850	6,375	6,300	8,175	....
Wyoming shaft,	97,325	17,100	22,075	22,325	16,100	....
Forty Fort colliery,	58,100	17,600	7,000	14,000	7,500	1,200
No. 1 Shaft, Kingston,	39,325	14,475	9,500	....	....	....
No. 2 Shaft, Kingston,	97,002	13,015	11,042	10,355	13,905	9,612
Gaylord slope,	60,000	38,300	22,700	....	....	....
Franklin slope,	55,867	24,140	24,010	....	....	....
Franklin Brown slope,	24,165	12,155	....	....	....	....
Maltby shaft,	43,525	14,225	350	20,525	1,600	....
Dobson shaft,	42,350	18,542	18,370	....	....	....
East Boston shaft,	55,237	12,750	16,150	11,825	....	....
Warrior Run,	32,500	7,000	9,500	5,400	9,200	....
Black Diamond,	38,000	21,780	8,420	....	....	....
Raubville,	35,800	19,000	15,850	....	....	....
Hillman,	4,200	3,600	....	....	....	....

erated in the Wilkes-Barre District, for the year ending December 31, 1881.

ING NEAR THE		Total cubic feet of air per minute passing near the face.	NUMBER OF PERSONS EMPLOYED IN EACH SPLIT ON THE DAY SHIFT.							Total cubic feet of air per minute at the outlet.
No. 6.	No. 7.		No. 1.	No. 2.	No. 3.	No. 4.	No. 5.	No. 6.	No. 7.	
. . . .	. . . .	79,878	52	50	42	50	51	. . . .	. . . .	145,877
24,276	24,673	133,711	7	45	4	50	66	. . . .	. . . .	162,777
. . . .	. . . .	84,097	4	13	23	10	5	. .	. . . .	108,652
. . . .	. . . .	51,375	43	25	22	. . . .	. . . .	. . . .	. . . .	125,500
. . . .	. . . .	19,437	36	26	. . . .	. . . .	. . . .	. . . .	. . . .	30,939
. . . .	. . . .	66,376	50	17	48	14	. . . .	. . . .	. . . .	124,895
. . . .	. . . .	102,120	15	45	40	25	. . . .	. . . .	. . . .	111,750
12,475	7,425	85,125	33	49	36	14	13	28	11	140,325
6,732	. . .	85,919	23	26	64	32	18	15	. . . .	141,924
. . . .	. . . .	55,682	24	32	24	50	. . . .	. . . .	. . . .	66,000
. . . .	. . . .	47,560	40	35	20	. . . .	. . . .	. . . .	. . . .	177,000
. . .	. . . .	63,787	50	5	6	. . . .	. . . .	. . . .	. . .	80,952
. . . .	. .	45,751	105	54	. . .	. . . .	. . . .	. . . .	. . . .	63,125
. . . .	. . . .	38,773	80	100	. . . .	. . . .	. . . .	. . . .	. . . .	43,401
. . . .	. . . .	36,797	45	32	. . . .	. . . .	. . . .	. . . .	. . . .	50,765
36,100	7,775	100,600	17	19	20	67	60	20	19	105,325
43,984	. . . .	201,968	40	50	40	65	35	. . . .	. . . .	254,690
. . . .	. .	157,625	15	21	58	58	Old wo rkings.		. . . .	162,350
31,690	25,150	159,689	70	106	44	38	6	68	85	245,412
4,550	. . . .	53,085	34	30	38	40	9	10	. .	73,795
. . . .	. . . .	39,019	14	36	45	42	. . .	. . . .	. . . .	61,553
. . . .	. . .	61,292	30	49	43	35	50	. . . .	. . . .	68,000
. . . .	. . . .	40,150	95	50	35	. . . .	. . . .	. . . .	. . . .	48,100
. . . .	. . . .	80,900	104	129	46	140	5	. . . .	. . . .	93,550
. . . .	. . . .	72,595	75	55	66	40	. . . .	. . . .	. . . .	100,177
. . .	. . . .	40,128	92	102	. . . .	. . . .	. . . .	. . . .	. . . .	61,375
. . . .	. . . .	43,636	49	17	18	. . . .	. . . .	. . . .	. . . .	54,383
. . . .	. . . .	59,750	48	45	. . . .	. . . .	. . . .	. . . .	. . . .	98,875
. . . .	. . .	103,612	128	59	. . . .	. . . .	. . . .	. . . .	. . . .	122,395
. . .	. . . .	73,575	30	23	42	30	. . . .	. . . .	. . . .	96,675
. . . .	. . .	38,296	62	30	. . . .	. . . .	. . . .	. . . .	. . . .	55,972
. . .	. .	17,000	80	. . . .	. . . .	. . . .	. . . .	. . . .	. . . .	27,000
. . . .	. . .	8,898	55	. . . .	. . . .	. . . .	. . . .	. . . .	. . . .	22,275
. . . .	. . .	7,100	32	. . . .	. . . .	. . . .	. . . .	. . . .	. . . .	15,710
. . . .	. . .	19,641	72	29	. . . .	. . . .	. . . .	. . . .	. . . .	23,142
. . . .	. . .	67,285	44	35	42	52	22	. . . .	. . . .	81,232
. . .	. . . .	46,487	60	47	. . . .	. . . .	. . . .	. . . .	. . . .	56,462
. . . .	. . . .	27,700	56	60	45	50	. . . .	. . . .	. . . .	51,125
. . . .	. . . .	87,600	50	50	50	36	. . . .	. . . .	. . . .	97,525
. . . .	. . . .	47,300	36	11	58	35	15	. . . .	. . . .	74,925
. . . .	. . . .	23,975	101	25	. . . .	. . . .	. . . .	. . . .	. . . .	42,300
. . . .	. . . .	57,929	28	16	16	29	27	. . . .	. . . .	111,255
. . . .	. . . .	61,000	63	54	. . . .	. . . .	. . . .	. . . .	. . . .	64,225
. . . .	. . . .	48,150	120	. . . .	. . . .	. . . .	. . . .	. . . .	. . . .	66,392
. . . .	. . . .	12,155	85	. . . .	. . . .	. . . .	. . . .	. . . .	. . . .	34,155
. . .	. . .	36,700	25	7	90	17	. . . .	. . . .	. . . .	44,550
. . . .	. . . .	36,912	52	65	. . . .	. . . .	. . . .	. . . .	. . . .	48,975
. . . .	. . . .	40,725	48	63	48	. . . .	. . . .	. . . .	. . . .	57,500
. . . .	. . . .	31,100	6	8	8	26	. . . .	. . . .	. . . .	34,000
. . . .	. . . .	30,210	100	56	. . . .	. . . .	. . . .	. . . .	. . . .	44,475
. . . .	. . . .	34,850	33	32	. . . .	. . . .	. . . .	. . . .	. . . .	35,850
. . . .	. .	3,600	41	. . . .	. . . .	. . . .	. . . .	. . . .	. . . .	4,350

The following report was received too late for publication in the report of 1880:

WILKES-BARRE, PA., *December 30, 1881.*

To His Excellency, HENRY M. HOYT,

Governor of the Commonwealth of Pennsylvania:

SIR: I have the honor of submitting this report, being for a fractional part of a year, from January 1 to July 19, 1880, as inspector of coal mines for the Wilkes-Barre, or Middle district of Luzerne and Carbon counties, of Pennsylvania, thus completing my second term of service in the said position, having been appointed first in July, 1870, and re-appointed in 1875.

I have but a brief report to make, as I will confine myself exclusively to reporting the fatal and non-fatal accidents that occurred during the time above-named.

There were twenty-one fatal accidents, causing the loss of twenty-six lives. These were all single, excepting one—the Nanticoke calamity, of March the 5th, by which six lives were lost. All that could be learned regarding the same was that there must have been gross carelessness on the part of the officer then in charge—a fire boss—who sacrificed his own life, being one of the six above referred to.

There were one hundred and three non-fatal accidents, causing injury to one hundred and twelve persons, many of which were very serious and a number only slightly.

Regarding the general condition of the mines, I have the pleasure and the honor to say that they would compare favorably with a similar number similarly situated in any other part of the State. At the expiration of my term of office, and now, after ten years of official labor among the coal operators and their subordinates—such as superintendents, foremen, bosses, fire bosses, &c., I most respectfully and sincerely tender them my thanks for their coöperation, assistance, encouragement, and sympathy during many hard trials. Then, again, I most heartily and sincerely tender my thanks and best wishes to that class, the workingmen, for whose especial benefit the *ventilation* law of 1870 was enacted. Many of those who were delving in the anthracite coal mines of Pennsylvania during and prior to 1870 must well recollect the very unhealthy and dangerous condition of the said mines in each and every part of the State, and they certainly can not fail to appreciate, to a great degree, the great benefit derived from the enactment and enforcement of the same. But those who have entered the mines since said period, know comparatively but little of its real blessings to the underground workmen. Yes, and those outside have also been bettered considerably by its protection. Hoping that the day may never dawn when the law will be made less effective, but that it may be so amended as to afford the protection it was intended to afford by its originators, is the earnest prayer of

Yours, very respectfully,

T. M. WILLIAMS.

TABLE No. 1.—*Fatal colliery Accidents in the Wilkes-Barre District from January 1 to July 19, 1880.*

DATE.	No. of accident.	Name of Colliery.	Name of Person Killed.	Age.	Widow.	Orphans.	Cause of Death.	Explosion of gas.	Falls of roof & sides	In shafts.	By blasting powder.	By mine cars.	Miscellaneous.	On surface.	Totals.
Jan. 8	1	Diamond colliery,	Joseph Flagle,	40			Explosion of gas in his chamber,	1							
23	2	Nottingham,	Job Jones,	65	1	1	Killed by fall of slate from roof,		1						
29	3	Gaylord shaft,	Thomas Palmer,	22	1		Killed by falling down a sinking shaft,			1					
					2	1		1	1	1					3
Feb. 2	4	Waddel colliery,	Daniel Connelly,				Fatally injured by falling in front of a car in motion, outside,					1			
12	5	No 2 tunnel, Nanticoke,	John Issett,		1	3	Killed by a blast prematurely,						1		
3	6	No. 2 shaft, D. & H. C. Co., Plym'th,	Peter Bevry,		1		Fatally injured by fall of rock,		1						
7	7	Pool's colliery,	Henry James,	48	1	1	Fatally injured, being crushed between cars near slope foot,					1			
7	8	Forty-Foot colliery,	William Moore,	47	1	3	Fatally injured, caught by cars near breaker,							1	
					4	7			1			2	1	1	5
Mar. 2	9	Sugar Notch colliery,	John Gaaghan,	23	1		Killed by fall of top coal,		1						
5	10	No. 2 shaft, Nanticoke,	James Henry,					1							
			Ed. Morgan,	19				1							
			William P. Austin,				Killed by the effects of an explosion of gas.	1							
			Joseph Audomott,				Carlessness of fire-boss Austin,	1							
			David T. Watkins,					1							
			John T. Watkins,					1							
31	11	Hartford colliery,	James O. Donnell,	20			Killed instantly by being kicked by a mule while starting a team,						1		
31	12	Empire colliery,	John Bannan,				Killed by collar falling upon him while handling timber,						1		
								6	1				2		9
Apr. 3	13	Diamond colliery,	Isaac Richards,	23			Killed by prop falling upon him while working for his brother,						1		
16	14	Diamond colliery,	John Dairs,	21	1		Killed by a battery breaking and letting coal down on him,						1		
16	15	Prospect colliery,	Patrick Redman,	23			Killed by a fall of rider coal in his own chamber,		1						

TABLE No. 1—*Continued.*

DATE.	No. of accident.	Name of Colliery.	Name of Person Killed.	Age.	Widow.	Orphans.	Cause of Death.	Explosion of gas.	Falls of roof & sides.	In shafts.	By blasting powder.	By mine cars.	Miscellaneous.	On surface.	Totals.
Apr. 26	16	Maltby colliery,	M. Condon,	12			Killed. Being caught in machinery in the the breaker,							1	
27	17	No 3 Baltimore colliery,	F. Boldbach,	14			Killed by falling in front of car in motion at the breaker,							1	
					1				1				2	2	3
May 12	18	Gaylord shaft,	J. B. Dale,	20			Killed by breaking of rope. The contractor not using proper care,						1		
													1		1
June 12	19	No. 3, West Nanticoke colliery,	Thomas J. Edwards,	40	1	5	Fatally injured, being caught between car and side,					1			
26	20	No. 3, West Nanticoke,	John Ransom,	30	1	3	Killed by being caught between cars near mouth of drift,					1			
					2	8						2			2
July 13	21	Gaylord colliery,	Ed. Jones,	14			Fatally injured; having fell in front of cars which run over him,					1			
												1			1

List of Non-Fatal Colliery Accidents in the Wilkes-Barre District, from January 1 to July 19, 1880.

Date.	No.	Name and Location of Colliery.	Names of Injured.	Cause of Accident and Apparent Extent of Injury.
Jan. 7	1	Henry colliery, Plainsville,	John Hollerin,	Leg injured by being struck by cars.
7	2	Exeter colliery,	Patrick Mullen,	Leg injured; caught between cars.
7	3	Prospect colliery,	Evan Williams,	Leg injured; caught between timbers.
14	4	Maltby colliery,	Samuel English,	Leg bone fractured by car striking him.
16	5	Maltby colliery,	Martin Reagan,	Injured on leg by car catching him.
20	6	Hartford colliery,	John J. Edwards,	Injured on face severely by fall of slate.
22	7	Dodson colliery,	Joshua Lamareux,	Foot injured by fall of slate.
24	8	Diamond colliery,	Frank Shuler,	Injured slightly by car striking him.
24	9	Mineral Spring colliery,	David Angus,	Leg broken by loaded car running over him.
24	10	Empire shaft colliery,	William Rodgers,	One rib broken by prop falling upon him while timbering.
24	11	Empire shaft colliery,	Richard George,	Shoulder blade broken by falling off a car in the mine.
24	12	Dodson colliery,	Dennis Swingle,	Leg broken by car catching him.
27	13	Exeter colliery,	Richard McHugh,	Injured by fall of black rock.
27	14	Prospect colliery,	Luke Doyle,	Injured by premature blast.
29	15	Enterprise colliery,	John Hayes,	Injured by fall of roof; severely.
30	16	Hartford colliery,	Benjamin Jones,	Jones and Parry were injured by explosion of a blast in rock, by foolishly risking to bore out the tamping from a hole that had missed fire.
			John Parry.	
30	17	East Boston colliery,	John M. Seebold,	Injured by explosion of a blast in coal, prematurely.
31	18	Prospect colliery,	John Cook,	Leg broken by cars in mines.
31	19	Baltimore tunnel,	William Haycock,	Foot injured severely by car running on it in sinking a slope.
Feb. 2	20	Forty Fort colliery,	John Stevenson,	Leg bone fractured by fall of coal.
3	21	Exeter colliery,	Walter Huff,	Leg injured severely by fall of slate.
9	22	No. 1 shaft, Nanticoke,	William J. Lyons,	Slightly hurt by fall of slate.
10	23	No. 4 tunnel, Nanticoke,	Stephen Ribler,	Face and body severely injured by cars.
11	24	No. 3 colliery, West Nanticoke,	David E. Davis,	Injured by starting coal in battery.
11	25	No. 3 colliery, West Nanticoke,	Lewis Hodges,	Injured by starting coal in battery.
12	26	Pine Ridge colliery,	James Hughes,	Leg injured by cars striking him.
18	27	No. 3 colliery, West Nanticoke,	John Samuels,	Injured slightly by coal starting.
23	28	No. 1 shaft, East Nanticoke,	John D. Williams,	Injured by a premature blast.
23	29	No. 1 shaft, Nanticoke,	Anthony Dacosta,	Injured by falling upon hoisting carriage.
23	30	Pine Ridge colliery,	James Dillon,	Dillon and Mack both burned by ignition of a quantity of blasting powder.
			Timothy Mack.	
18	31	Baltimore slope colliery,	John Leonard,	Slightly injured by fall of coal.
20	32	Hollenback shaft,	Charles Yunchann,	Injured on face and arm in extinguishing a fire.
20	33	Dodson shaft,	George Jones,	Jones and Munday injured by a blast in rock in taking out tamping from a missed hole.
			Alfred Munday.	
26	34	Maltby colliery,	James Williams,	Injured by piece of coal falling upon him.
28	35	Chauncey colliery,	Thomas Egleston,	Leg injured between two cars.
Mar. 1	36	Forty Fort colliery,	John Dawson,	Head slightly hurt by falling of piece of rock on it.
4	37	No. 1 shaft, Nanticoke,	Thomas S. Williams,	Slightly injured on body by car striking him; on main road.
8	38	Hutchison colliery,	William Barry,	Injured slightly on head and leg by fall of coal.
16	39	No. 2 colliery, Kingston Coal Co.,	Oliver Simonson,	Had two fingers taken off; injured by cars turning switch.
17	40	Gaylord colliery, Plymouth,	John Griffith,	Had his hand injured in breaker; caught near screen.
17	41	Nottingham colliery,	Thomas E. Davis,	Injured slightly by car striking his leg.
18	41	No. 2 colliery, Kingston Coal Co.,	Robert McCormic,	Injured severely by fall of slate.

List of Non-Fatal Colliery Accidents—*Continued.*

DATE.	No.	Name and Location of Colliery.	Names of Injured.	Cause of Accident and Apparent Extent of Injury.
Mar. 19	42	Hartford colliery,	Michael McGuire,	Squeezed severely between mine car and door post or frame.
25	43	No. 3 colliery, West Nanticoke,	Asel Sutliff,	Arm severely injured, being crushed between cars at breaker.
25	44	No. 1 Baltimore tunnel, D. & H.,	Cornelius Boyle,	Injured by car striking him and a mule, while driving.
29	45	Sugar Notch, No. 9,	Patrick Bradshaw,	Seriously bruised; jammed between car and side.
29	46	Midvale colliery,	Alexander Egleson,	Injured on back by flying coals from blast he had just fired.
29	47	Franklin, old slope,	Michael Campbell,	Burned slightly by gas; taking naked and safety lamps, both lit, into the gas.
April 6	48	Ellenwold shaft colliery,	Walter Frank, M. McMahon. John Fury. J. Fitzmorris.	All burned, more or less, by powder; putting a lamp into an empty powder keg, or what they supposed was one, but which contained a small amount—sufficient to slightly burn the whole party.
7	49	Pine Ridge colliery,	William O. Guyer,	Injured slightly by coals from a blast exploding before he got away from the hole.
10	50	Midvale colliery,	John Chaple,	Body injured by fall of roof.
10	51	East Boston colliery,	Patrick Holleran,	Leg injured by foot being caught between frog and rail, and car running over it.
13	52	Hollenback shaft,	William J. Davis,	Leg injured; caught between cars.
13	53	East Boston colliery,	Ll. Davis,	Hand injured by fall of slate.
13	54	Audenreid colliery,	William T. Smythe,	Arm broken, being caught by rope at bore-hole.
14	55	No. 3 colliery, D. & H. C. Co., Plymouth,	M. W. Smith,	Seriously burned from explosion of blasting powder, through carelessness of himself.
14	56	Mill Creek colliery,	Peter Peterson,	Seriously injured by a blast: having bit off the match short, he lit the squib.
14	57	No. 4 slope, Nanticoke,	Abraham Richards, William T. Edwards. Lloyd Croxson.	All three men were more or less injured, but not seriously, by a fall of bony coal.
15	58	No. 2 colliery, Kingston Coal Co.,	Thomas W. Davis,	Injured by piece of coal striking him while barring down same.
16	59	Midvale colliery,	John Hamon,	Injured by being kicked by a mule.
19	60	No. 3 colliery, West Nanticoke,	James McCarty,	Burned on face and arms by explosion of gunpowder; spark falling into same from his lamp.
21	61	Chauncey colliery,	Thomas O'Boyle,	Leg broken by a fall of bony coal.
21	62	Prospect colliery,	Conrad O'Donnell,	Injured on leg by coals from blast.
22	63	Midvale colliery,	Henry Griffith,	Severely injured by an explosion of a blast.
27	64	No. 2 colliery, Kingston Coal Co.,	Patrick Bilbo,	Leg amputated; caused by jumping on moving car and falling under.
May 4	65	Prospect colliery,	Evan J. Jones,	Injured slightly by a fall of slate.
4	66	Hollenback shaft,	John Sillivan,	Injured on thigh by being jammed between cars.
12	67	Wyoming colliery,	Bartley Doran,	Slightly burned from gas.
12	68	Wyoming colliery,	J. B. Thornton,	Injured by coals from a blast.
12	69	No. 2, D. & H., Plymouth,	Thomas Cobley,	Injured by runaway car striking him.
12	70	No. 1 tunnel, Nanticoke,	M. Smolinsky,	Severely injured between car and side, while driving.
18	71	No. 1 shaft, Nanticoke,	John Lloyd,	Slightly burned by gas explosion, through carelessness.
21	72	No. 2 shaft, Nanticoke,	William Issett,	Leg badly injured by car passing over it.
12	73	Gaylord shaft,	Ed. P. Jones,	Injured by breaking of rope, same time that J. B. Dale was killed.
18	74	Mineral Spring colliery,	Gottlieb Ritz,	Leg broken by falling coal.
18	75	Sugar Notch, No. 9,	John Brisbin, John Cray,	Both burned on face and hands by explosion of gas in chamber.
25	76	Diamond colliery,	Thomas Edwards,	Leg broken by fall of coal.
25	77	Sugar Notch, No. 9,	Michael Lenahan,	Three ribs broken by a mule falling against him.
25	78	Mineral Spring colliery,	John Cortson,	Severely injured by a fall of slate from roof.

	26	79	Prospect colliery, Oakwood shaft,	Jerry Hurley,	Arm broken, being caught between car and side at shaft foot.
	28	80	Pool's colliery,	John Davis,	Injured slightly by a fall of fire clay.
June	2	81	Diamond shaft colliery,	William Haggerty,	Leg broken, being caught between cars.
	2	82	Prospect colliery,	Bernard Fox,	Ankle injured, being caught between car and side of door.
	2	83	Prospect colliery,	Robert Nesbitt,	Leg injured by car leaving the track.
	3	84	No. 3 colliery, West Nanticoke,	A. M. Morgan,	Injured seriously by timber rolling over him.
	4	85	Pine Ridge colliery,	Daniel Trolan,	Burnt by gas explosion in chamber.
	8	86	Hutchison colliery,	James Updike,	Leg broken by fall of slate.
	9	87	Mineral Spring colliery,	Daniel Harrington,	Shoulder and arm broken by falling when going from a blast.
	9	88	No. 1 tunnel, D. and H. C. Co.,	Frank Madden,	Arm badly crushed by car catching him against side.
	9	89	No. 4 tunnel, Nanticoke,	John Livingston,	Face and back hurt by fall of coal.
	10	90	Oakwood shaft, Prospect colliery,	Evan A. Jones,	Leg broken by car jumping the track, and catching him against the side.
	12	91	Oakwood shaft, Prospect colliery,	John Bevan,	Burnt quite severely on face by explosion of gas between two—or double—doors.
	15	92	Exeter colliery,	William R. Williams,	Bone of one arm broken, being caught by engine starting against the side, &c.
	16	93	Nottingham colliery,	Reese W. Roberts,	Arm broken; caught between two cars.
	16	94	Pine Ridge colliery,	Michael Kearney,	Burnt slightly by gas explosion.
	19	95	Mineral Spring colliery,	O. A. Parsons,	Injured on hip and arm quite severely, while dumping coal.
	21	96	No. 2 shaft, Kingston Coal Company,	Peter McHugh,	Injured slightly by explosion of a blast.
	25	97	Midvale colliery,	James Martin,	Injured on leg, being caught between two cars at foot of slope.
	25	98	Gaylord slope colliery,	John Drew,	Leg injured; bone fractured by coals flying from car at slope foot.
July	6	99	Hollenback shaft colliery,	Michael Dougher,	Thigh and three ribs broken by a fall of piece of coal on main gangway.
	6	100	Exeter colliery,	Michael Ratchford,	Injured slightly by explosion of a blast; he had gone to re-touch.
	7	101	Enterprise colliery,	Martin Finerty,	Severely injured by explosion of a blast prematurely.
	8	102	Boston colliery,	William Esaw,	Leg injured by car running over it, having fallen in front when it was in motion.
	10	103	No. 2 shaft, Nanticoke,	John D. Gilbert,	Burnt by explosion of gas in cross-cut; carelessly.

LUZERNE AND CARBON COUNTIES.

EASTERN DISTRICT.

Office of Inspector of Mines, &c.,
Eastern District of Luzerne and Carbon Counties,
Scranton, Pa., *March 11, 1882.*

To His Excellency Henry M. Hoyt,
Governor of the Commonwealth of Pennsylvania:

Sir: In compliance with the requirements of section twenty-two of an act of General Assembly, approved 3d day of March, A. D. 1870, entitled an act providing for the health and safety of persons employed in coal mines, &c., I have the honor to submit herewith statements of fatal and non-fatal accidents that took place in this district, during the year ending December 31, A. D. 1881, together with tabulated tables, showing the condition in which I found the coal mines and collieries of this district, on my assuming the duties of inspector of mines, on the 5th day of October last.

In my official visits and examinations of the different coal mines and collieries in this district, I find their condition improving, in relation to the requirements of the ventilation laws of 1870, and with few exceptions, I find but little cause of complaint.

Knowing from experience, that wherever there is want of discipline in and about coal mines and collieries, there is where most accidents occur. In order to prevent as many accidents as possible, I called a meeting of the coal operators and mining superintendents, to establish a code of mine rules and regulations for the better protection of life and property. After several meetings, they adopted such regulations, and they were printed on December 24, 1881. (A copy of which is hereto attached.) If the parties in charge of mines carry these regulations out in good faith, (which they ought to do,) I am of the opinion that it will be the cause of saving many valuable lives, and be the means of preventing many serious

accidents to the thoughtless and inexperienced workers in mines, thereby relieving the tax-paying community of the support of widows, orphans, and cripples, which might become a public burden.

In my investigations into the sourse of accidents in mines, I find that a great many are caused by the use of an inferior quality of oil, which is used very extensively. It is a compound of lubricating or black oil and kerosene. It throws off large volumes of smoke, vitiating the air to such an extent that it is unhealthy to breath, and its odor is very offensive. It requires a large volume of air to dispel it and render it fit for respiration. The use of this oil in mines I consider a violation of sections seven and twenty of the mine laws of 1870. Whenever I can get such testimony as will justify me in bringing an action in court, I will test the legality of its use in the mines of this district.

There have been mined in this district, for the year 1881, 7,711,660 tons of coal. If the coal trade should demand more coal for the present year, we are in a condition to mine and prepare at least 10,000,000 tons.

Respectfully submitted,

PATRICK BLEWITT,
Inspector of Mines, &c.

GENERAL IMPROVEMENTS.

Fairmount Shaft Colliery.

This is a new colliery, located in Pittston township, on the line of the Susquehanna division of the Central railroad of New Jersey. It consists of a shaft opening, ten by twelve feet, and one hundred and ten feet deep, to the next seam of coal below the Pittston seam. The coal is six feet thick. The breaker has a capacity of preparing about four hundred tons of coal per day. The second opening is a rock tunnel driven from the Pittston seam of coal to the mine workings. Ventilation is produced by a fan twelve feet in diameter by three and two thirds feet face. There is a safety carriage for use when necessary.

Seneca Slope Colliery.

There was a new plane built at this colliery, four hundred and fifty feet long, with friction gear attached, for hoisting culm from the breaker. They also extended the slope inside three hundred and fifty feet more to the third seam of coal, and put in place a forty horse-power engine, which hoists three cars of coal up the slope each trip; also placed four new boilers at mouth of slope to furnish steam for new engines, &c.

Twin Shaft Colliery.

They erected a new fan at this colliery fifteen feet in diameter, by four and a half feet face, also finished new breaker, with a capacity of four hundred tons of coal per day.

Mosier Shaft Colliery.

They erected a new fan at this shaft sixteen feet in diameter by four feet face. They also placed in position three new boilers, thirty-five feet long by thirty inches in diameter.

Phœnix Shaft Colliery.

They are sinking this shaft, at present, to the lower seams of coal, and it will be in operation again about the 1st of next June.

Stetler Shaft Colliery.

This is a new shaft, located in Marcy township, Luzerne county, on the line of the Lackawanna and Bloomsburg division of the Delaware, Lackawanna and Western Railroad Company. They commenced sinking the shaft last August. The size of the shaft opening is ten by twenty-eight feet in the clear. The probable depth of the shaft will be one hundred and ten feet. The second opening shaft is ten by twelve feet in the clear.

Machinery.—There are two hoisting engines, two hundred horse-power; one breaker engine, eighty horse-power; and one fan engine, forty horse-power, to run a fan twelve feet in diameter by three and a half feet face. There are six boilers in place, forty feet long by thirty-four inches in diameter. The only work they are doing at present is sinking the shafts.

No. 1 Shaft, Greenwood Colliery.

This is a new shaft, located in Lackawanna township, and on the line of the Lehigh and Susquehanna division of the Central railroad of New Jersey. The shaft opening is eleven by twenty-eight feet, and they are now down to the coal, one hundred and fifty-five feet from the surface.

National Colliery.

A hoisting tower and chutes have been erected at this colliery, and the old shaft is being sunk to the No. 5 seam of coal. The shaft opening is eleven by twenty-seven feet, and it is down one hundred feet from the surface. It has cut the No. 3 or Clark seam of coal. The probable depth will be about two hundred and thirty feet.

Pine Brook Shaft Colliery.

This shaft has been sunk one hundred and twelve feet deeper from the Clark to the rolling-mill or four foot seam of coal. They have also located a circular shaft fourteen feet in diameter. It is sunk from the surface two hundred and eighty-seven feet deep to the same seam of coal. It is located two hundred feet northeast of the main shaft. The company intend erecting two fans, seventeen feet in diameter, over the opening of the second opening shaft, which will be used for an air shaft also.

Fair Lawn Sope Colliery.

This slope has been sunk eighty feet deeper to the seam of coal below the Clark.

Green Ridge Slope Colliery.

The old breaker has been torn down and a new addition has been built to the breaker, which was erected six years ago, thereby doubling its capacity. Also a new plane was built from mouth of slope to breaker. Also put in a new pair of hoisting engines, rated at one hundred and twenty-five horse-power. Also improved the fan so as to increase its capacity twenty-five per cent.

Lucas New Shaft.

This shaft is located on property owned by William Von Storch, Esquire, at Green Ridge, city of Scranton, and on the line of the Delaware and Hudson Canal Company's railroad. The shaft opening is ten by thirty feet. It is down about sixty feet; twenty-five feet in gravel and thirty-five feet in rock. The breaker walls are all completed, also the boiler-house for two nests of boilers, three in each nest. The boilers are forty feet long by thirty-four inches in diameter. They are using one pair of hoisting engines, ten by ten inch cylinders, sixty horse-power. There are thirty sinkers employed, and twenty carpenters framing timbers for breaker. The capacity of the breaker will be about one hundred and eighty thousand tons of coal per annum.

Pancost Coal Company's Colliery.

This is a new colliery, located on three hundred and fifty acres of land on the east side of the Lackawanna river, in the borough of Dickson City. Work was commenced on the 20th day of last June. Since that time, a slope has been driven seven hundred and fifty feet in the big vein or seam of coal which is fifteen feet thick. The slope opening is seven by fourteen feet. Seven hundred feet east of the slope a shaft has been sunk seventy feet deep to the Clark seam of coal. The shaft opening is ten by twenty-two feet. In connection with these openings, and connected with them by three thousand feet of railroad track, a new breaker has been erected with a capacity of from seven hundred to eight hundred tons of coal per day. The coal is taken from the slope and shaft by a locomotive, twelve tons weight, on a three-foot gauge track.

MACHINERY.—At the head of the slope a hoisting engine, seventeen by forty-two inch cylinder, has been put up; also five boilers thirty-four feet long by forty inches in diameter. There is also an engine at the shaft and one at the breaker. All the necessary buildings are erected. They are now shipping about two hundred and fifty tons of coal per day.

Throop Shaft Colliery.

This is a new colliery, which will be operated by two shafts, one for hoisting coal, and the other for the use of the men and supplies; they are sinking both at present. These shafts are located in Priceville, on the northwest side of the Lackawanna river, on lands leased by John Jermyn, Esquire. The lease was made on November 20, 1881. The tract contains

ten hundred and fifty acres of land. Three days after the lease was signed, they commenced sinking the shafts. After sinking the main shaft about six feet through gravel, they had to go through fifty-five feet of quicksand and four feet of large bowlders, making the distance from the surface to the rock sixty-five feet, occupying seven months' time to get to the rock.

They had a great deal of difficulty going through the quicksand. The mode of going through the quicksand was as follows: they made the size of the timbers and shaft opening seventeen and a half by thirty-four feet. The size of the timbers were twelve by fourteen inches. The first four sets were mortised together and bolted with one-inch iron bolts, six on each side, and three on each end. On the fifth set they mortised braces in each corner, eight by twelve inches, to keep the timbers plumb, every alternate set of timbers were so braced. Every third set was bolted to the fourth with same number of bolts as first four sets. The timbers were put in from the top and forced down as the shaft was sunk, until a depth of thirty feet had been reached, and then the timbers stuck fast. They then procured two pieces of iron weighing twelve hundred pounds each. They then made a frame twenty-five feet high, same as a pile-driver, with snatch block at bottom and top. Had a good team at each end. By these means they forced the timbers down, overcoming all difficulties, and succeeded in getting to the rock. After getting through about eight feet deep into the rock, they commenced to re-timber, making size of shaft opening ten by twenty-six feet. This left a space of two feet all around between the timbers. This space they filled up with concrete, (broken stone the size of an egg and cement,) using about eight hundred barrels of the latter. I think this makes one of the most substantial shafts in this section of the country. The main shaft is now down about three hundred and forty-five feet. At one hundred and nineteen feet from the surface, they cut through seven and a quarter feet of good coal; at two hundred and forty-seven feet from the surface, they cut through fifteen feet of coal and bone. Seven feet on top was very fine coal, with no slate or other impurities then two feet of bone, then two feet of coal, then two feet more of bone, and then two feet of coal, making in all eleven feet of coal and four feet of bone. This is considered the Big or Fourteen Foot seam of coal. The shaft that they are sinking for second opening and air shaft is located three hundred and thirty feet northwest of the main shaft. The opening is ten by eighteen feet, and it is sunk one hundred and eighty feet below the surface. They have a tower built over each shaft, and the breaker partially built at the main shaft. The machinery at main shaft is one pair of hoisting engines, twenty-four by forty-eight inches cylinder first motion three hundred horse power; one breaker engine, sixteen by thirty-six inches cylinder, one hundred horse power. The boiler-house is a very substantial brick building, with twelve boilers in place, thirty-four feet long by thirty-six inches diameter, with four blowers under each set of three boilers for burning culm, which works to perfection. At second opening shaft there is one pair of hoisting engines,

twenty-inch cylinder, two hundred horse power, one fan engine, eighteen by thirty inch cylinder, eighty horse power to run a twenty-foot fan. There is also a brick engine-house here, with six boilers in place, for burning culm. They are building two breakers at this colliery, with a capacity of one thousand tons per day each. There are a number of men engaged here sinking the shafts and building the breakers. When this colliery is completed it will be one of the best equipped and most substantial in this mining district.

The Lackawanna Coal Company's New Shaft.

This is a new shaft which they are sinking. At present the shaft opening is ten by thirty-four feet, and is down fifty feet from the surface. It is located in Blakely borough on the north-west side of the Lackawanna river, on property leased by the company from Stevens, Hull, and others.

They are working a large force of men sinking the shaft and building all the necessary appendages for a first class colliery.

Jones, Simpson & Co.'s New Shaft.

This shaft is located in Archibald borough, on a tract of land leased by the company, of C. B. Hackley, Esquire. It is about one and one half miles west from the Lackawanna river. It will be connected with their present breaker by railroad track eleven thousand two hundred feet long, the coal to be hauled by locomotive power to the breaker from the shaft. The shaft opening is ten by thirty-four feet. It is sunk about seventy-five feet. The probable depth of the shaft to Archibald seam of coal is one hundred and twenty-five feet.

Belmont Colliery.

This is a new colliery, and consists of three drifts, in Carbondale. Bottom seam of coal, and a new breaker, with a capacity of preparing about four hundred tons of coal per day. It is located in the upper end of Carbondale city, and about fifteen hundred feet east of the Lackawanna river. It is owned and operated by the Butler Coal Company.

The Pennsylvania Coal Company.

This company have made considerable improvements during the year, but their officers have made no detailed statements of the same.

DELAWARE, LACKAWANNA AND WESTERN RAILROAD COMPANY.

Pyne Shaft.

The company have graded a new gravity plane in this colliery to let the coal down on the West mountain side of shaft.

Continental Shaft.

Re-sunk from G or big seam to the Clark, now operating both seams of coal.

Hampton Shaft.

Sinking a new slope from Diamond seam to F or Rock seam so as to

work the Rock seam out that was left in the Oxford shaft. The rock seems to be of better quality east of the shaft than on the west.

Central Shaft.

This shaft has been re-timbered, as to new buntons and guides, from bottom to top, and also a new fan put in to re-place the old one.

Oxford Shaft.

Put in new cribbing on top of shaft, and are now in process of sinking from Rock to big and Clark seams of coal about one hundred and sixty feet deeper.

Oxford Air-Shaft.

Has connected with G or big seam workings in Central mines. Put in two new hoisting engines, also a fan engine; also a new fan, twelve feet diameter by three and a half feet face. The intention is to lower the coal from the Diamond and Rock seams to the Big and hoist it up the Central main shaft. The distance to be lowered is one hundred feet. Also put in new cribbing on top of shaft.

Scranton Coal Company's Slope.

This mine has been cleaned and new rails re-laid preparatory to commence to work the Clark seam of coal, are now ready to operate. This slope has been idle for years.

No. 2 Diamond Shaft E or Diamond seam.

Are sinking a new slope from the Diamond to the Rock or F seam. The opening is seven by eleven feet in the clear. More than half the distance is already sunk.

Tripp Slope

Made an extra opening in the West mountain, by driving up the pitch about 40° for ninety feet, then sunk a shaft fifty-seven feet deep. It gives an intake for air in the extreme end of the mine workings, and an opportunity for the men to come out that way, if they feel so disposed. This shaft is one and three fourths miles from the mouth of the slope.

Brisbin Shaft.

A heading has been driven to the outcrop on the West mountain from the level gangway, and they are now grading three gravity planes to let the coal down the steep grades from the West mountain side.

Cayuga Shaft.

This shaft has been overhauled, and new cribbing put in to a depth of about sixty feet from the surface.

Storr's Shaft.

This is a new shaft, located in Dickson City borough. It is about two thousand feet northwest from the Lackawanna river. The sinking is pro-

gressing slowly. It is not developed enough at present to give it an extended notice here. It will be fully reported next year.

DELAWARE AND HUDSON CANAL COMPANY.

No. 3 Jermyn's Shaft, Green Ridge.

This colliery is operated by the Delaware and Hudson Canal Company and the Delaware, Lackawanna and Western Railroad Company, in partnership. They are now grading a slope in coal inside, which will be eight hundred feet long, when completed, on the northwest side of the shaft, also a new gravitation plane, four hundred feet long, on the east side of the shaft.

Von Storch Slope.

They are erecting another ventilating fan at this colliery in addition to the fan which they have there at present. The new fan is seventeen feet diameter by four feet face. This is to ventilate the fourteen feet and Diamond seams of coal. The old fan, which is twenty feet diameter by five feet face, will be used exclusively for the Clark seam of coal. They have just finished a slope, six hundred feet long, in coal in the Clark seam, on the southeast side of shaft.

Legitt's Creek Shaft.

They have re-opened the Diamond seam of coal, which has been idle for four years. They are now ready for operation.

Marvine Shaft.

They are now building a gravitation plane, six hundred feet long, in the fourteen feet seam of coal, on southeast side of shaft. Also sinking a slope in coal on northwest side of shaft, which will be about twelve hundred feet long when finished. They are also driving for second opening in Diamond seam, by connecting with Diamond seam in Legitt's Creek shaft. The connection is now made.

Olyphant, No. 2.

They have built a new breaker over second opening shaft of this colliery, and call it Eddy Creek breaker. They have cut and graded a new gravitation plane to bring coal to foot of shaft from the northwest side of the property.

Grassy Island Shaft.

They are sinking a new air shaft at this colliery. It is timbered down to the rock, a distance of twenty feet from the surface. The size of shaft opening is eleven by fourteen feet. They are now drilling a bore-hole in the air shaft to let the water down through to the mine workings. They expect to finish bore-hole in a few days. The contract for sinking shaft is already let. The intention is to put up two fans on the same shaft, seventeen feet diameter by four feet face, each. They are to be run by two

engines, one placed on each side of the shaft, and connected to the fans by direct motion.

White Oak Colliery.

They have completed an air shaft at this colliery. The shaft opening is twelve by twelve feet, and it is thirty feet deep from the surface. They are going to erect a fan, seventeen feet diameter by four feet face, over the air shaft opening, which is to be run by a single engine, connected by belt. They have also put in place one nest of three boilers; also put in place a steam-pump, and necessary connections, to pump water out of the slope. The slope is also graded, ready to hoist coal as soon as the water is pumped out.

Jermyn, No. 1, Shaft.

They are now sinking an air shaft. The opening is fourteen by fourteen feet. It is timbered down to the rock, a distance of seventeen feet from the surface. They have a bore-hole in the bottom of air shaft, so the water is going down into the old workings forty-seven feet through rock. They expect to erect a fan over air shaft, seventeen feet diameter by four feet face, to be run by a single engine, and connected to fan by a belt. They are also sinking a slope in coal inside for a third lift.

RULES ADOPTED BY THE COAL OPERATORS AND MINE SUPERINTENDENTS OF THE EASTERN DISTRICT OF THE WYOMING AND LACKAWANNA COAL FIELDS, AT THE MINE INSPECTOR'S OFFICE, SCRANTON, PENNSYLVANIA, DECEMBER 24, 1881.

Preamble.

All persons employed in or about this colliery are hereby notified that the following rules and regulations have been adopted for the purpose of preventing injury to persons or property from negligence or carelessness of the employés.

The attention of each class of workmen is hereby called to the duties assigned them; they are also requested to do all in their power to avoid all unnecessary risk in following their daily avocations.

Mine Boss.

It shall be the duty of the mine boss to direct and generally supervise the whole working of the mine. He shall instruct the workmen in their several duties and vocations.

It shall be his special duty to keep the work in proper shape as it advances. He shall keep a careful watch over the ventilating apparatus, airways, traveling-ways, pumps and sumps, and shall see that the miners timber their places properly as they advance, and see that they keep their places safe from danger of loose coal, slate, or rock falling upon them. If he shall find a place in a dangerous condition, it shall be his duty to give orders to have it secured by taking down or propping up the loose material, with the least possible delay; or, if necessary, he shall stop the mining of coal at once, until it is secured. He shall also see that the signaling ar-

rangements from bottom to top and from top to bottom of the shaft or slope are kept in good condition. And he or his assistants shall examine carefully the workings generating explosive gas every morning before the miners enter the mine; and shall ascertain that the mine is free from danger before the workmen are allowed to enter. He or his assistants shall go over the mine every evening and see that the doors along the air-passages are properly closed. It shall also be his duty to measure the ventilation at least once a week at the inlet and outlet; also, at or near the face of all gangways, and the measurements to be reported to the inspector once per month.

Fire Boss.

It shall be the duty of the fire boss to examine carefully every morning every place in the mine where explosive gas is evolved, and see that it is in a fit state for men to work therein before they are allowed to enter the mine. If any of the working places are in an unsafe condition, he shall notify the parties who work therein by danger-signal or otherwise, and they shall be governed by his advice in the absence of the mine boss.

If explosive gas is found in any of the working-places, he shall not allow the men to enter said place or places until he is present to expel or see that it is expelled safely. When a signal board is furnished, he shall mark opposite the number, name, or letter (by which the party is known who works in said place) a mark thus X, indicating danger. It will then be the duty of all persons working in said place to immediately ascertain the cause of danger, and no one will be allowed to enter such place until authorized by the mine boss or fire boss.

He shall also mark the date of the month with chalk upon some conspicuous place at the face of each place examined, every morning, and shall be located at some convenient place designated by the mine boss, where he may be seen after his examining tour by every person working in the mine, and there find out the condition of their working place. Any miner or laborer going into his working place where explosive gas is evolved without ascertaining in person the condition of the same, shall be stopped at once, and the same reported to the mine boss. It shall be his special duty to see that all stoppings, doors, brattices and airways are kept in proper condition, and he shall report any defect which he may find in them to the mine boss. He shall also see that all the safety lamps used in the mine are kept in good order; also, keep a careful watch over the ventilation.

Driver Boss.

The driver boss shall see that the drivers are at the stables in proper time in the morning, and ready to begin work at the appointed time. He must see that the mules are regularly fed and watered, and properly attended to, and must see that the mules are not driven up steep grades without frequently resting them. He shall see that the mules are not unnecessarily whipped or abused.

If the safety of persons or animals require a safety-block or latch to be thrown across the track, near the face of working places, he shall see that one or the other be put on at once. He shall not allow door boys to leave their doors except by permission of himself or mine boss.

Duty of Miner.

It shall be the duty of every miner employed in the mine to examine the roof or other overhanging material in his working place as soon as he shall enter the same in the morning, and if found unsafe he shall immediately take down or prop up the loose material, and see that it is in a safe condition for himself and laborers to work therein. No miner shall leave his place in an unsafe condition when his laborers are allowed to work after he has gone home. If the mine boss shall order bad roof to be taken down, or shall order props to be set under the same, it shall be the duty of the miner to attend to the same without unnecessary delay. It shall also be the duty of the miner to take proper care of his powder from the time it leaves the powder house until it reaches his working place in the mine, at which place it must be properly taken care of, and kept in a box, with cover to place over it, when the miner is not present. This box must be kept well back from the roads. When the miner is making a cartridge he shall keep his lamp at least four feet away from the nearest part of his box. Said lamp shall be placed upon that side of the box which the current of air would carry a spark from the lamp away from the box. He shall not be allowed to make a cartridge with a lamp upon his head, or his pipe in his mouth, nor shall he set his lamp upon his box. When charging a hole, if the cartridge sticks, he must take it out of the hole carefully, and either make the cartridge smaller or enlarge the hole, so that he may be able to push it easily into it. No ramming of cartridges with a drill will be allowed.

When driving an entrance between two chambers it shall be the duty of the miner, before firing a shot, to give timely notice to the men in the chamber towards which he is driving, so that they may find a place of safety. They shall also guard the passages on either side of their place, at every shot, so that no person may come unawares upon it when about to fire. They shall also be careful not to go back too soon to a shot which seemed to have missed fire.

When a shot has been fired, they shall take great care to examine the roof and coal, and see that they are in a safe condition before they go to work under them.

They shall also see that their car is at safe distance before firing a shot. Before loading their car, they, or their laborers, shall see that no tools, powder, or other material is left in their car. They shall also see that the car is properly blocked and spragged before starting to load it, and after every shot they must see that the road is left clear before the mule shall be allowed to draw the car to the end of the road near the face.

Where explosive gas is evolved they must learn the condition of their working place before entering the same. Where gas is strong and issuing out in great volumes they shall see that no loose coal or culm is left at the face over night, and that no gas is left burning when they leave their place after the day's work is done. Where blowers of gas are found issuing out of the bottom, no culm or gob shall be left in close proximity to it. They shall also guard against all kinds of accidents, which are liable to occur in a mine, and, as far as practicable, they shall keep their props and gob at least two feet from the road.

Laborer or Helper.

It shall be the duty of every mine helper or laborer to take proper care n running his car from the face to the gangway. He shali see that it is properly spragged, so that no runaway may occur, whereby persons or property may be injured; and he shall not run his car down to the gangway until called upon. When letting a car down, he must not go before it to hold it back, but shall sprag the wheels sufficiently, and, if necessary, push it when it does not run with the proper number of sprags. It shall also be his duty to fill his road properly for the mule to travel in, and, as far as practicable, he shall keep the sides of his road sufficiently clear of culm or other material, so that a person or mule may pass a car with ease. Where head or stopping blocks are provided for cars to rest against, he shall see that they are properly placed upon the road, as he is going up, so that they may be in a proper position when the car comes down. He shall also look into his car before loading it, and see that no tools, sprags, or other material, excepting coal, is left in it. He shall see that the car is properly secured before commencing to load it, by putting a sufficient number of sprags in the wheels, and, if necessary, he shall place a prop securely against the lower end of the car. He shall devote his time principally to cleaning, preparing, and loading his coal, but, when necessary, he shall help his miner to set props and do any other work which requires his aid.

Headman and Footman.

It shall be the duty of the headman and footman, at every shaft where men have to ascend or descend to be at their proper places when the mine shall be regularly at work, or at such times as the mine boss may designate, and they shall see that not more than ten men are allowed to ascend or descend at the same time on any carriage. If more than ten men shall get on at one time, it shall be their duty to call upon some of them to come off. If the person or persons so called shall refuse to do so, they shall report them to the mine boss, whose duty it shall be to punish them as they deserve. They shall not allow any person to step on the carriage after the signal has been given for the engineer to hoist or lower the carriage, nor leave the carriage until it has rested upon the bottom or top.

It shall also be the duty of the headman or footman to pay strict attention to the signaling apparatus, and see that they are kept in good condi-

tion, so that they may, at all times, communicate intelligently with the engineer, and they must see that all of the signals are properly understood between them.

Driver.

It shall be the duty of a driver to take proper care of his horse or mule, and see that it is properly fed and watered. He must not whip or abuse it unnecessarily, or allow any other person to do so. He shall drive it carefully, and when ascending steep grade allow it to rest frequently. When he leaves his mule or horse at any time, he must be careful to leave it in a place of safety, where it will be secure from runaway cars or other danger. When drawing cars into a place he must be careful not to drive his mule or horse any further than the track is laid, nor into a pile of coal at or near the face, or to leave the car at a place where he has no room to pass it. If the road is in a bad condition for want of filling, he shall report the same to the mine boss. When drawing cars upon a graded road, he shall be careful to sprag or block the cars sufficiently to prevent them from running upon himself or mule. If head or stopping blocks are used at certain points upon the gangway or main road, he shall see that they are properly placed upon the road when going up with the empty cars, so that they may be in a proper position to stop the cars before they go on to the steeper grade.

If any person abuses his mule or horse he must report the same to the mine boss, nor will they be allowed to delegate any other person to take out or return their mules to the barn, nor drive their mules to or from the barn faster than a walk.

Company Hands.

All company hands must be at their proper places in the morning to begin work at the proper time, and must not leave until breaker stops, or if working full day they are expected to work the ten hours, and they shall see that all instructions given them by the mine boss or foreman are strictly carried out.

Door Boy.

It shall be the duty of a door boy to be at his post at all times when the mine is regularly at work.

He must not leave his door at the command of any person except the mine boss or other person to whom he may delegate such authority.

Outside Foremen.

It shall be the duty of outside foremen to direct and generally supervise the outside business over which he is placed. He shall see that all machinery connected with the breaking and preparing of coal be properly fenced off as required by law, and he or his assistants shall see that all persons are free from the machinery before the signal is given for the engineer to start, and see that the boys are kept in their proper places, and not allowed to play about the machinery or cars.

Hoisting Engineer.

It shall be the duty of an engineer to keep a careful watch over the machinery, pumps, steam boilers, &c. He shall see that the boilers are properly supplied with water, and that the steam pressure shall not exceed the limit to which the superintendent of machinery or other officer shall consider them perfectly safe to carry. When a fan is used for ventilation he shall keep it running at such speed as the mine boss or superintendent may direct. He shall not slacken its speed unless directed to do so by said officers. If any repairs are to be made to the fan or other parts of its machinery whereby it is required to be stopped, it shall be his duty to give the mine boss timely notice of the same, so that he may have everything left in proper order. He shall also work his engine slowly and with great care when persons are ascending or descending the shaft. He shall also see that the safety carriage is in good order before letting men down in the morning, and must examine the safety-catches, ropes. and cover, and other parts of the machinery daily, and shall run the safety carriage up and down before allowing men to descend the shaft in the morning. He shall not allow persons to loaf in the engine-room, nor shall he engage in conversation when in the act of lowering or hoisting men or coal. He shall also keep a strict watch over the fireman, and see that he attends to his duties faithfully.

Breaker Engineers.

Breaker engineers shall pay strict attention to all signals from the breaker. He shall not start or move his engine until he is satisfied, either by metal tube or other signal, that all persons are free from the machinery. He shall see that no one is allowed to go around any of the machinery for the purpose of oiling or otherwise, except such persons as are authorized by the foreman.

Slate Bosses.

The slate bosses shall keep the boys in their respective places, and not allow them to go around the machinery or cars. They shall use the greatest caution on all occasions when boys or men are cleaning out rollers or screens, and see that every person is clear of the machinery before giving the signal to the breaker engineer to start his engine.

Penalties.

For the violation of the above rules and regulations, it shall be the duty of the mine boss or foreman to suspend, discharge, or otherwise punish any person who shall carelessly or willfully neglect to attend to the duties assigned to them.

When damage to property is carelessly or willfully done, the party so offending shall be subject to pay for the full amount of damage, and may be suspended or discharged for the same offense.

General Rule.

All persons are hereby forbidden to enter any of the old workings without consent of the mine boss or fire boss, or ride upon the cars on any slope or plane, or send out tools upon a car of coal unless they follow them out and take them off the car before ascending the shaft or slope. Any person who opens a door must see that it is properly closed before leaving it. No person shall be allowed to travel upon a slope or plane while the same is in motion. Persons ascending or descending a shaft will not be allowed to enter upon or leave the carriage while in motion, nor shall they be allowed to step on after the signal has been given to hoist or lower the carriage.

Any person knowing of the unsafe condition of any place or of damage done to the doors, brattices, or stoppings or obstructions in the air-passages, shall notify the mine boss or fire boss as soon as possible after said damage has been done.

Any person found guilty of carelessly or wickedly injuring animals or other property shall be held liable for the full amount of damage done to the same.

All persons must familiarize themselves with the above rules, and any person violating any of said rules will be dealt with as the superintendent may direct.

I approve the above regulations.

Patrick Blewitt,
Inspector of Mines, &c.

TABLE No. 1.—*List of accidents resulting in death, reported to the inspector of including all of Lackawanna, and a portion of Wayne and Susquehanna counties, ending 31st day of*

DATE.	No. killed	Names.	Age.	Widows.	Orphans.	Colliery where Accident Occurred.
Jan. 3	1	Bernard Gaffeny,	40	1	7	White Bridge tunnel, D. & H. C. Co., Carbondale,
3	2	John McDonnell,	38	1	4	do. do. do. do.
12	3	David Richards,	27	1		Mt. Pleasant slope. Hyde Park,
14	4	Robert Lynott,	62	1		Twin shaft Pittston C. Co., Pittston,
Feb. 1	5	John Loftus,	26	1	3	Grassy Island shaft, D. and H. C. Co., Olyphant,
19	6	David Havard,	28	1	1	No. 6 shaft, P. C. Co., Jenkins township,
19	7	Joseph Deihl,	23	1	3	Mt. Pleasant slope, Hyde Parke,
19	8	Michael Wirth,	18			do. do.
21	9	W. J. Packer,	40	1	2	Elk Hill colliery, Dickson City,
22	10	Patrick Healy,	23			No. 7 shaft, P. C. Co., Jenkins township,
24	11	William Lloyd,	50	1	4	Von Storch slope, D. and H. C. Co., Providence,
Mar. 9	12	Charles Ericson,	20			Hillside colliery, Pleasant Valley,
10	13	Patrick O'Boyle,	50	1	1	Meadow Brook shaft, Scranton,
15	14	Benj. J. Jones,	41	1		School Fund slope, Scranton,
30	15	Griffith Reese,	50	1	5	No. 2 Diamond slope, Scranton,
April 1	16	William Hensley,	34	1	3	Heidelburg shaft, L. V. C. Co., Pittston twp.,
11	17	Edward Burbank,	14			Von Storch slope, D. and H. C. Co., Providence,
19	18	John Messett,	18			Taylor shaft, D. L. & W. R. R. Co., Taylorville,
May 4	19	Peter Roberts,	35	1	3	Central shaft, D. L. & W. R. R. Co., Hyde Park,
6	20	James Finnessey,	16			Green Ridge slope, G. R. C. Co., Dunmore,
7	21	Patrick Kearney,	40	1	5	Central shaft, D. L. & W. R. R. Co., Hyde Park,
17	22	John Butler, jr.,	19			No. 11 shaft, P. C. Co., Jenkins township,
20	23	Patrick Mahon,	50	1	3	Green Ridge slope, G. R. C. Co., Dunmore,
June 28	24	James P. Mahan,	17			Meadow Brook shaft, William Connell & Co., Scranton,
July 15	25	John Quinan,	14			Green Ridge slope, G. R. C. Co., Dunmore,
Aug. 6	26	Jas. T. Armstrong,	50	1		No. 2 Diamond shaft, D. L. and W. R. R., Co., Scranton,
6	27	John Saltry,	50	1	6	Green Ridge shaft, Jermyn, Scranton,
9	28	John Carloyne,	16			Pyne shaft, D. L. & W. R. R. Co., Old Forge twp.
11	29	Anthony Brogan,	42	1	6	Jermyn's shaft, Jermyn borough,
15	30	Michael Durkin,	34	1	4	School Fund slope, Hyde Park,
Sept. 5	31	Patrick Devers,	55	1	9	No. 4 shaft, P. C. Co., Jenkins township,
5	32	Patrick Kelly,	42	1	6	do. do. do.
20	33	Thomas McHale,	65	1	10	Hillsdalle colliery, Pleasant Valley,
21	34	Michael Lavelle,	60	1	7	Meadow Brook tunnel, Scranton,
Oct. 10	35	John Coyne,	60			Fairmount Shaft colliery, Pittston.
14	36	John Thomas,	14			Cayuga shaft, D. L. and W., Providence,
15	37	Casper Applenaup,	35			Taylor shaft, D. L. & W. R. R. Co., Taylorville,
17	38	Wm. Broudhurst,	15			Cayuga shaft, D. L. & W. R. R. Co., Providence,
19	39	Henry Hammond,	30			School Fund slope, Hyde Park,
Nov. 12	40	Harry Coad,	18			Cayuga shaft, D. L. & W. R. R. Co., Providence,
21	41	David Davis,	35	1	1	Taylor shaft, D. L. & W. R. R. Co., Taylorville,
21	42	Patrick McDonnell	37	1	4	No. 6 slope P. C. Co., Pittston,
25	43	Patrick Gorman,	23			No. 6 shaft, P. C. Co., Jenkins township,
Dec. 1	44	Andw. McDermott,	13			Central breaker, P. C. Co., Pleasant Valley,
10	45	James Clifford,	11			Ontario breaker, L. V. C. Co., Pleasant Valley,
29	46	Anthony O'Boyle,	19			No. 5 shaft, P. C. Co , Jenkins township,
31	47	William Walker,	14			Erie colliery, H. C. and I Co., Glenbourn bor...
				26	97	

NOTE—There were eleven deaths caused by falls of roof, equal . . . . . 23.40 per cent.
There were eleven deaths caused by falls of coal, equal . . . . . 23.40 do.
There were eleven deaths caused by being crushed by mine cars, equal 23.40 do.
There were five deaths caused by explosion of CH4 gas, equal . . . . . 10.65 do.
There were two deaths caused by explosions of blasts, equal . . . . . 4.25 do.
There was one death caused by an explosion of giant powder, equal . 2.13 do.
There was one death caused by being crushed by hoisting carriage, equal 2.13 do.
There was one death caused by mine rails falling off car on him, equal . 2.13 do.
There were two deaths caused by falling down shafts, equal . . . . . 4.26 do.
There were two deaths caused by being caught in machinery, equal . . . 4.25 do.

100 00

the Eastern District of the Wyoming coal fields, Luzerne and Carbon counties, now State of Pennsylvania, and the cause as shown by his investigation for the year December A. D. 1881.

Nature or Cause of Death or Accident.	No. killed.
Both these men were killed instantly, by an immense fall of roof, being strata between the bottom and top coal, from which they were recklessly chopping out props for the purpose of letting down, in order to take down the top coal,	1
	2
Killed by a fall of roof immediately after firing a blast, which discharged a prop,	3
Seriously burned by an explosion of gas; died on January 23,	4
Killed instantly by a fall of roof,	5
Killed instantly by fall of coal and rock, immediately after firing a blast,	6
Killed by being crushed by loaded cars on the slope,	7
Killed by being crushed by loaded cars on the slope,	8
Killed instantly by a fall of top coal, entirely through his own neglect,	9
Killed by falling down the shaft from the carriage, as he was being hoisted,	10
Killed instantly by a fall of roof, immediately after firing a blast which had discharged two props, which he rushed in to re-stand,	11
Killed by a fall of roof through neglect of the miners,	12
Killed instantly by a fall of top coal through his own neglect,	13
Killed by falling down an air shaft, a distance of seventy feet,	14
Killed instantly by being crushed by a trip of cars and on which he was riding,	15
Killed instantly by an explosion of giant powder,	16
Fatally burned by an explosion of gas; died the following night,	17
Killed instantly by a fall of top coal,	18
Killed instantly by a fall of coal from the roof,	19
Killed instantly on the main road, near the foot of the slope by a fall of roof,	20
Fatally burned, and otherwise injured by an explosion of gas; died about four hours after,	21
Killed instantly by a fall of black rock through the negligence of his miner,	22
Killed instantly by an explosion of a blast in bottom rock, which hung fire with Daddow & Beadle's patent squib, and to which he returned too soon,	23
Back and legs seriously injured by being crushed by mine cars; died July 29,	24
Fatally injured by being crushed by mine cars on a run-away; died same day,	25
Killed instantly by a fall of roof immediately after firing a blast,	26
Killed instantly by a fall of roof; found dead by the driver,	27
Killed instantly by being crushed by mine cars under which he fell while unhitching his mule,	28
Killed instantly by being crushed by the carriage at the foot of the shaft,	29
Killed instantly by a fall of roof, from under which he was knocking out a prop,	30
Fatally burned by an explosion of CH4 gas in the old works, where he went against orders,	31
Seriously burned by the same explosion; died September 11,	32
Fatally injured by mine rails rolling off a flat car on him while unloading them,	33
Killed by being crushed by a loaded mine car inside at his chamber branch,	34
Seriously injured by flying coal from a blast; died October 21,	35
Killed by being hit by a runaway car in mines,	36
Seriously injured by a fall of roof; died next morning,	37
Killed—jumped on moving loaded trip of mine cars; in getting off foot caught, and was dragged about three hundred feet; died next morning,	38
Seriously injured by a fall of bone coal; died same day,	39
Seriously injured by being caught in the breaker machinery; died three and one hours after,	40
Seriously injured by a fall of top coal; died one hour after,	41
Seriously injured by a fall of rider coal; died one day after,	42
Killed instantly by a fall of black rock,	43
Killed instantly by being caught between two cars, outside, close to chute,	44
Seriously injured by being caught in pony rolls of breaker; died seven hours after,	45
Seriously injured by a fall of black rock; died two hours after,	46
Seriously injured by being caught between two mine cars; died half hour after,	47

Total deaths for year 1881, equal 47
Number of widows for year 1881, equal 26
Number of orphans for year 1881, equal 97
There were 164,073 tons of coal mined for each death.
There were 296,602 tons of coal mined for each widow.
There were 79,502 tons of coal mined for each orphan.

TABLE No. 2.—*List of serious and non-fatal accidents reported to the Inspector now including all of Lackawanna, and a portion of Wayne and Susquehanna the year ending 31st day*

DATE.	No. injured.	Names.	Age	Colliery where Accident Occurred.
Jan. 12	1	Pierce Eastman,	21	Dodge shaft, D. L. & W. R. R. Co., Lackawanna,
14	2	William Harrison,	48	Twin shaft, Pittston C. Co., Pittston,
14	3	Michael Lynott,	23	do. do.
14	4	Martin Healey,	24	do. do.
20	5	Charles McDonnell,	18	Phœnix shaft, Ransom township,
24	6	John Woods,	14	Meadow Brook shaft, Scranton,
26	7	Patrick Corcoran,	43	No. 4 shaft, P. C Co., Jenkins township,
Feb. 9	8	Peter Holleran,	15	Gipsey Grove colliery, P. C. Co., Dunmore borough,
12	9	John R Griffiths,		Taylor shaft, D. L. & W. R. R. Co., Taylorville,
14	10	James Hagerty,	14	Roaring Brook shaft, Dunmore borough,
16	11	Thomas Richards,	10	Von Storch colliery, D. & H. C. Co., Providence,
17	12	Michael O'Boyle,	13	Roaring Brook shaft, Dunmore borough,
22	13	Charles Gilmartin,	33	No. 5 shaft, P. C. Co., Jenkins township,
24	14	Patrick Healey,	16	No. 10 shaft, P. C. Co., Hughestown borough,
26	15	Dennis Ruane,	17	Dodge shaft, D. L. & W. R. R. Co., Lackawanna twp.,
Mar. 11	16	Patrick Sweeney,	34	Laws' shaft, P. C. Co., Pleasant Valley borough,
11	17	Henry Williams,	22	Taylor shaft, D. L. & W. R. R. Co., Taylorville,
14	18	James Cawley,	15	White Oak colliery, D. & H. C. Co., Archbald,
16	19	Thomas Bennett,	40	Sloan shaft, D. L. & W. R. R. Co., Lackawanna twp.,
21	20	John Carney,	19	Erie shaft, H. C. & I. Co., Carbondale,
Apr. 6	21	Thomas J. Thomas,	11	Archbald shaft, D. L. & W. R. R. Co., Lackawanna twp,
12	22	John Kane,	38	Grassy Island shaft, D. & H. C. Co., Olyphant,
19	23	Thomas Evans,	28	White Bridge tunnel, D. & H. C. Co. Carbondale City,
26	24	Clement Marsh,	14	Hyde Park shaft, D. L. & W. R. R. Co., Hyde Park,
27	25	William Barrett,	44	No. 8 shaft, P. C. Co., Hughestown borough,
29	26	Michael McGowan,	15	Spring Brook colliery, H. C. & I. Co., Moosic,
30	27	Watkin Morgan,	54	Dodge shaft, D. L. & W. R. R. Co., Lackawanna twp.,
30	28	Michael Heston,	14	Barnum shaft, P. C. Co., Pittston,
May 6	29	Michael Golden,	13	Roaring Brook shaft, Dunmore borough,
6	30	Frank Jennings,	15	No. 13 shaft, P. C. Co., Pleasant Valley borough,
7	31	Patrick Brown,	14	No. 3 shaft, D. & H. C. Co., Carbondale City,
17	32	Thomas Reese,	13	No. 2 Diamond slope, D. L. & W. R. R. Co., Hyde Park,
18	33	Timothy Finnerty,	38	No. 9 shaft, P. C. Co., Hughestown borough,
24	34	Alfred Davies,	28	Hyde Park shaft, D. L. & W. R. R. Co., Hyde Park,
June 1	35	Charles Killgallon,	37	Erie shaft, H. C. & I. Co., Carbondale township,
2	36	William Price,	19	Von Storch slope, D. & H. C. Co., Providence,
7	37	John Flynn,	14	Central shaft, D. L. & W. R. R. Co., Hyde Park,
7	38	Adam Seite,		Twin shaft, Pittston Coal Company, Pittston,
8	39	David Thomas,	14	Von Storch slope, Providence,
14	40	James McDonnell,	52	No. 4 shaft, P. C. Co., Jenkins township,
16	41	Peter Moyle,	9	Cayuga shaft, D. L. & W. R. R. Co., Providence,
17	42	John C. Williams,	50	No. 4 shaft, P. C. Co., Jenkins township,
17	43	Thomas Kelly,	21	do. do.
18	44	John Loughney,	33	Leggitt's Creek shaft, D. & H. C. Co., Providence,
22	45	Richard Davis,	16	Bellevue shaft, D. L. & W. R. R. Co., Lackawanna twp,
22	46	Martin Crafton,	46	No. 10 shaft, P. C. Co., Hughestown borough,
27	47	William Campbell,	24	Mosier shaft, B. C. Co., Hughestown borough,
27	48	Joseph Kelly,	21	do. do. do.
29	49	George Thomas,	18	Tompkins shaft, A. T. & Co., Pittston,
30	50	James Patterson,	35	Green Ridge shaft, J. J., Scranton,
July 2	51	John Dennabaum,	22	Capouse shaft, L. & I. C. Co., Hyde Park,
6	52	Timothy Connors,	50	Eaton colliery, J. S. & Co., Archbald,
7	53	Patrick McNulty,		Filer colliery, F. & Levey, Winton borough,
11	54	John Flynn,	40	Grassy Island shaft, D. & H. C. Co., Olyphant,
15	55	Thomas Bennett,	40	Sloan shaft, D. L. & W. R. R. Co., Lackawanna twp.,
18	56	Lawrence Moran,	50	Hampton shaft, D. L. & W. R. R. Co., Hyde Park,
20	57	John McCue,	57	No. 10 shaft, P. C. Co., Hughestown borough,
21	58	Thomas Evans,	14	Brisbin shaft, D. L. & W. R. R. Co., Providence,
22	59	William Powell,	14	Archbald shaft, D. L. & W. R. R. Co., Lackawanna twp,
23	60	John Davies,	15	School Fund slope, Hyde Park,
29	61	Hugh Campbell,	14	Cayuga shaft, D. L. & W. R. R. Co., Providence,
29	62	James Crouthier,	40	No. 10 shaft, P. C. Co., Hughestown borough,
Aug. 2	63	John Moran,	42	No. 2 slope, P. C. Co., Jenkins town-hip,
8	64	Martin Quinn,	40	No. 4 shaft, P. C. Co., Jenkins township,
10	65	William Williams,	50	Sloan shaft, D. L. & W. R. R. Lackawanna township,
11	66	Joseph Shotts,	14	Von Storch slope, D. & H. C. Co., Providence,
12	67	George Genader,	17	School Fund slope, S. F. A. Co., Hyde Park,
12	68	David Griffiths,	19	Jermyn shaft, J. J., Jermyn borough,
12	69	Thomas Dougherty,	40	Barnum shaft, P. C. Co., Pittston,
15	70	Joseph Smith,	32	Jermyn's shaft, J. J., Jermyn borough,
17	71	Thomas Cawley,	24	No. 10 shaft, P. C. Co., Hughestown borough,
20	72	Thomas Richards,	14	Brisbin shaft, D. L. & W. R. R. Co., Providence,
23	73	Michael McAndrews,	20	No. 12 shaft, Pennsylvania C. Co., Pleasant Valley,
25	74	John Lloyd,	48	Cayuga shaft, D. L. & W. R. R. Co., Providence,
26	75	Robert Herring,	33	Barnum shaft, P. C. Co., Pittston,

of the Eastern District of the Wyoming coal fields, Luzerne and Carbon counties counties, State of Pennsylvania, and the cause as shown by his investigation, for of December, A. D. 1881.

Nature or Cause of Death or Accident.	No injured.
Leg injured by a fall of roof; leg amputated,	1
These men were severely burned by an explosion of carbureted hydrogen gas. The accident was the result of the most unaccountable stupidity on the part of William Harrison, the mine boss, who led the men in with the naked lights when he was looking for gas,	2 3 4
Leg fractured between the ankle and knee by a fall of roof,	5
Seriously injured in the body, face and hands by being crushed by mine cars,	6
Arm fractured at the wrist by a fall of top coal, which he was barring down,	7
Leg fractured above the knee by falling in front of mine car,	8
Burned and otherwise injured by explosion of powder in drilling out the charge,	9
Finger cut off by hook attached to rope while trying to unhitch on outside plane,	10
Hand badly crushed by being drawn into the screen,	11
Collar bone fractured by falling under mine car while unhitching mule,	12
Two ribs fractured and chest otherwise injured by a fall of coal and rock,	13
Arm fractured above the wrist by being caught between a car and prop,	14
Arm fractured by being caught between bumbers of cars while coupling them,	15
Leg fractured above the ankle by car jumping the track, catching him,	16
Leg fractured by a fall of roof,	17
Hand badly mashed under wheels of mine car,	18
Ankle dislocated by a fall of roof,	19
Seriously bruised between the shoulders by carriage, under which he was passing, foot of shaft,	20
Wrist fractured and dislocated by falling of a platform at the breaker,	21
Head severely injured and arm badly cut by a fall of bony coal,	22
Leg badly cut by being knocked down by mine cars,	23
Severely injured by being crushed by a water car while opening door for car to pass,	24
Leg fractured above the knee by a fall of top coal, through his own neglect,	25
Head, shoulders, and back injured by being crushed by mine cars,	26
Head seriously injured by a fall of roof,	27
Collar bone fractured by being crushed between car and door post,	28
Body injured by falling down the second opening shaft, 40 feet, (not dangerous,)	29
Head cut and leg bruised by mule running away, dragging him, as he was caught in the traces,	30
Hips severely injured by being crushed between loaded cars and a pillar,	31
Arm fractured while helping to put a car on the track,	32
Leg fractured and face injured by a fall of roof,	33
Head injured by being crushed between top railing of mine car while coupling them,	34
Seriously injured by a miner's needle running through his body,	35
Wrist fractured and back bruised by being knocked under cars by a mule,	36
Arm fractured by being crushed against a prop by a mule,	37
Eye, arm, and leg injured by a premature blast, caused by cutting off end of squib,	38
Leg fractured below the knee by a mule falling upon him,	39
Ribs fractured and back injured by a fall of roof,	40
Head injured by falling off trestling leading to culm bank outside,	41
Both these men were seriously burned about the face and hands by an explosion of CH4 gas in old chambers which were abandoned several years ago,	42 43
Leg badly crushed by a fall of top coal, but no bones broken,	44
Foot burst open by being caught in the track, and the car running on to it,	45
Ankle dislocated and leg injured by a fall of top coal,	46
Head painfully injured by coal from a blast fired in an entrance,	47
Head dangerously injured by the same blast,	48
Face and hands burned by an explosion of a gallon of kerosene oil,	49
Face and breast seriously injured by an explosion of a blast, to which he returned too soon,	50
Leg fractured above the knee by a fall of roof, while in the act of re-standing a prop,	51
Hip dislocated by falling while barring down a slab of rock,	52
Leg fractured at the ankle and cut on the head by a fall of roof,	53
Arm fractured by being struck by a piece of coal,	54
Leg fractured by a fall of coal immediately after firing a blast,	55
Leg fractured above the knee by a fall of roof,	56
Ankle dislocated and chest bruised by a fall of coal from the side,	57
Head injured by being crushed by mine car,	58
Arm badly fractured by being bit by a mule; he had no business near the mule,	59
Arm fractured and otherwise injured by falling off culm car, the wheel crushing his arm,	60
Stomach injured by a kick from an ugly mule,	61
Head pierced through by a pick, the blow being struck by his partner,	62
Ankle dislocated by a fall of roof,	63
Face and hands burned by an explosion of carburetted hydrogen gas,	64
Ribs fractured and flesh severely lacerated by a premature blast,	65
Foot and leg injured by the foot being caught between the latch and rail, car running on it,	66
Leg severely cut by being crushed by mine cars,	67
Leg fractured by a premature blast,	68
Leg fractured at the ankle by a fall of roof,	69
Arm fractured and foot badly bruised by a fall of coal,	70
Leg fractured by a fall of top coal,	71
Arm fractured by falling under a mine car,	72
Leg fractured and head injured by a fall of top coal,	73
Three ribs and collar bone fractured by a trip of runaway cars at foot of shaft,	74
Leg fractured above the ankle by a fall of black rock,	75

TABLE No. 2—

DATE.	No. injured.	Names.	Age.	Colliery where Accident Occurred.
Aug. 31	76	John Thomas,	23	Archbald shaft, D. L. & W. R. R. Co., Lackawanna twp.,
Sept. 5	77	Thomas McHale,	14	Spring Brook colliery, H. C. & I Co., Moosic,
8	78	Daniel Sullivan,	15	Dodge shaft, D. L. & W. R. R. Co., Lackawanna twp.,
8	79	Martin Hart,	52	No. 4 slope, P. C. Co., Jenkins township,
8	80	John O'Hora,	15	Gipsy Grove colliery, P. C. Co., Dunmore borough,
10	81	Alexander Brown,	28	Stark shaft, P. C. Co., Pleasant Valley,
10	82	Matthew Bralligan,	20	No 7 shaft, P. C. Co., Jenkins township,
10	83	James McNulty,	17	do. do. do.
13	84	Anthony Thornton,	47	Marvin shaft, D. & H. C. Co., Providence,
29	85	Dennis O'Lennahan,	38	Archbald shaft, D. L. & W. R. R. Co., Lackawanna twp.,
30	86	Patrick Coleman,	14	Spring Brook colliery, Pleasant Valley,
Oct. 5	87	George Morgan,	57	Grassy Island shaft, D. & H. C. Co., Olyphant,
8	88	John Flynn,	14	Central shaft, D. L. & W. R. R. Co., Hyde Park,
10	89	Dennis Grimes,	55	Tripp's slope, D. L. & W. R. R. Co., Hyde Park,
10	90	Martin Devers,	40	Fairmount shaft, Pittston township,
12	91	Edward Dougher,		No. 2 slope, P. C. Co., Jenkins township,
13	92	David Richards,	50	Cayuga shaft, D. L. & W. R. R. Co., Providence,
14	93	John W. Nicholson,	17	Jermyn shaft, John Jermyn, Jermyn borough,
13	94	William Davis,	46	Hampton shaft, D. L. & W. R. Co., Lackawanna twp.,
Nov. 2	95	Thomas Reid,	14	No. 9 shaft, P. C. Co., Pittston,
3	96	Thomas J. Jones,	44	Hyde Park shaft, D. L. & W. R. R. Co., Hyde Park,
10	97	John Maloney,	23	Tunnel No. 1, Penn'a C. Co., Pittston,
12	98	William McHale,	15	Archbald shaft, D. L. & W. R. R. Co., Lackawanna twp.,
15	99	Patrick Kerrigan,	40	Sibley shaft, P. N. A. C. Co., Old Forge township,
16	100	David Evans,	35	No. 2 Diamond slope, D. L. & W. R. R. Co., Hyde Park,
28	101	Martin Howley,	29	Tunnel, No. 1, P. C. Co., Pittston,
28	102	James McLain,	15	Barnum shaft, P. C. Co., Pittston,
Dec. 5	103	Geary Murray,	24	Cayuga shaft, D. L. & W. R. R. Co., Providence,
5	104	John Murray,	23	E. Vein Diamond, D. L. & W. R. R. Co., Hyde Park,
6	105	John Coon,	40	Taylor shaft, D. L. & W. R. R. Co., Taylorville,
14	106	Gwilim Jones,	14	Central shaft, D. L. & W. R. R. Co., Hyde Park,
29	107	James Judge,	15	No. 4. shaft, Penn'a C. Co., Jenkins township,

Continued.

Nature or Cause of Death or Accident.	No. injured.
Back severely injured by a fall of roof, through the negligence of the miner,	76
Cheek-bone fractured by a kick from a mule—outside,	77
Severe flesh wound on leg, by being crushed between mine cars,	78
Ribs fractured and otherwise injured by a fall of coal,	79
Arm fractured, by being thrown from his mule outside,	80
Hip dislocated, by a fall of bony coal,	81
Both men were injured about the head and back, by a fall of roof immediately after firing a blast, which had knocked out two props,	82 83
Head seriously injured, by a fall of top coal,	84
Thigh fractured and otherwise injured, by being crushed by a mine car,	85
Leg fractured above the knee, by being crushed by mine cars,	86
Leg fractured, by a fall of top coal and slate,	87
Arm fractured between the wrist and elbow; fell when walking along road in mine,	88
Leg fractured, by a fall of coal and roof.	89
Seriously injured; got hit by flying coal from a blast,	90
Leg fractured below the knee, by getting hit with a car,	91
Leg fractured, by being caught between two cars in mine,	92
Arm fractured, by a fall of roof,	93
Leg crushed, by a piece of coal falling on it. (Foot amputated above the ankle,)	94
Seriously injured by being run over by a car—outside,	95
Seriously injured, by a fall of top coal,	96
Two of his toes cut off, by a fall of top coal,	97
Left arm fractured, by being run over by a car,	98
Leg fractured below the knee, by a fall of roof,	99
Right foot cut off above the ankle, by a fall of top coal,	100
Leg fractured by falling, while walking across chamber,	101
Arm fractured, by being caught between two loaded cars,	102
Leg fractured, by being caught between mine car and rib,	103
Seriously injured, by a fall of roof,	104
Leg fractured, by a fall of roof,	105
Arm crushed, by falling under a trip of mine cars,	106
Shoulder-blade fractured, by being caught between mine cars and props,	107

Legs fractured by falls of coal, (amputated afterwards,)	3
Legs fractured by falls of roof, (amputated afterwards,)	1
Legs fractured by falls of roof,	8
Legs fractured by falls of coal,	7
Legs fractured by mine cars,	7
Legs fractured by blasts,	1
Legs fractured by mules,	1
Legs fractured by miscellaneous causes,	1
Total,	29

Arms fractured by falls of roof,	1
Arms fractured by falls of coal,	3
Arms fractured by mine cars,	9
Arms fractured by mules,	3
Arms fractured by miscellaneous causes,	2
Total,	18

Other serious injuries from falls of roof,	9
Other serious injuries from falls of coal,	10
Other serious injuries from blasts,	5
Other serious injuries from mine cars,	17
Other serious injuries from mules,	3
Other serious injuries from explosions of carbureted hydrogen gas,	6
Other serious injuries from explosions of powder,	1
Other serious injuries from premature blast,	1
Other serious injuries from miscellaneous causes,	8
Total,	60

Recapitulation.

Legs fractured,	29
Arms fractured,	18
Other serious injuries,	60
Total serious injuries,	107

NOTE.—There were 72,072 tons of coal mined for each serious accident.

TABLE No. 3.—*List of slight accidents reported to the Inspector of the Eastern all of Lackawanna and a portion of Wayne and Susquehanna counties, State of the 31st day of*

Date.	No. of accidents.	NAMES.	Age.	Colliery where Accident Occurred
Jan. 7	1	Patrick Kelly,	31	Tripp's slope, D., L. & W. R. R. Co., Hyde Park,
15	2	Thomas Gerrity,	36	Pine Brook shaft, L. I. & C. Co., Scranton,
19	3	George Dignon,	21	Erie shaft, H. C. & I. Co., Glenwood borough,
20	4	Charles Harp,	40	Phœnix shaft, Ph. C. Co., Ransom township,
25	5	Thomas Cawley,	23	No. 10 shaft, Penna. C. Co., Hughestown borough,
31	6	Patrick Lynott,	28	Legitt's Creek shaft, D. & H. C. Co., Providence,
Feb. 2	7	John White,	45	Coal Brook colliery, D. & H. C. Co., Carbondale,
2	8	Charles Merrick,	18	Hillside colliery, H. C. & I. Co., Pleasant Valley,
3	9	John Jones,	40	Capouse shaft, L. I. & C. Co., Hyde Park,
3	10	Martin Barrett,	35	Heidelberg shaft, L. V. C. Co., Pittston,
9	11	Frank Siddons,	14	Pierce colliery, Pierce C. C., Archbald,
10	12	George Northrup,	21	Green Ridge slope, G. R. C. Co., Dunmore,
14	13	Charles Riley,	26	Elk Hill colliery, E. H. C. Co., Dickson City,
21	14	Patrick Monehan,	16	No. 6 shaft, Penna. C. Co., Jenkins township,
22	15	Patrick O'Malia,	14	No. 10 shaft, Penna. C. Co., Hughestown borough,
22	16	Phillip Roache,	16	Meadow Brook shaft, W. & C. Co., Scranton,
23	17	David Griffiths,	43	Von Storch slope, D. & H. C. Co., Providence,
24	18	Thomas Guennessy,	16	No. 3 shaft, D. & H. C. Co., Carbondale,
28	19	John Caffney,	49	Pine Brook shaft, L. I. & C. Co., Scranton,
March 3	20	John Corcoran,	35	White Oak colliery, D. & H. C. Co., Archbald,
3	21	Laurence O'Hara,	15	do. do. do.
4	22	Thomas R. Davies,	36	School Fund slope, S. F. A., Hyde Park,
7	23	Timothy Lyons,	40	Seneca slope, Pittston C. Co., Pittston,
8	24	Patrick Roach,	10	Archbald shaft, D., L. & W. R. R., Lackawanna twp.,
8	25	Thomas Thomas,	16	do. do. do.,
14	26	Michael Nealon,	15	Eddy Creek shaft, D. & H. C. Co., Olyphant,
14	27	Timothy Parfery,	15	Green Ridge slope, O., S., J. & Co., Dunmore,
15	28	Thomas Williams,	29	School Fund slope, S. F. A., Hyde Park,
15	29	Evan Jenkens,	31	do. do. do.
18	30	Patrick Walsh,	22	No. 10 shaft, Penna. C. Co., Hughestown borough,
31	31	William Jones,	22	Archbald shaft, D., L. & W. R. R., Lackawanna twp.,
April 1	32	William R. Williams,	41	Heidelberg shaft, L. V. C. Co., Pittston township,
11	33	Phillip Mertagh,	18	Von Storch slope, D. & H. C. Co., Providence,
14	34	Llewelyn H. Jones,	16	Capouse shaft, L. I. & C. Co., Hyde Park,
14	35	Martin Walsh,	33	Roaring Brook shaft, R. B. C. Co., Dunmore,
19	36	Thomas R. Williams,	22	Capouse shaft, L. I. & C. Co., Hyde Park,
19	37	Edward Philbin,	33	No. 7 shaft, Penn. C. Co., Jenkins township,
21	38	Daniel Williams,	45	Marvin shaft, D. & H. C. Co., Providence,
27	39	Thomas Gallagher,	55	No. 1 tunnel, Penna. C. Co., Pittston,
29	40	Henry Evans,	40	Hyde Park shaft, D., L. & W. R. R. Co., Hyde Park,
29	41	Bartley Reagan,	16	Tripp's slope, D., L. & W. R. R. Co., Hyde Park,
May 2	42	Thomas Rosser,	15	Taylor shaft, D., L. & W. R. R. Co., Taylorville,
3	43	Thomas Reese,	16	Central shaft, D., L. & W. R. R. Co., Hyde Park,
5	44	Martin Cameron,	15	Meadow Brook tunnel, W. C. & Co., Scranton,
6	45	Thomas Sipples,	50	Meadow Brook shaft, W. C. & Co., Scranton,
7	46	Thomas J. James,	40	Taylor shaft, D., L. & W. R. R. Co., Taylorville,
9	47	Thomas Morris,	40	Tripp's slope, D., L. & W. R. R. Co., Hyde Park,
25	48	John Keilott,	45	Hyde Park shaft, D., L. & W. R. R. Co., Hyde Park,
26	49	Henry Williams,	17	Von Storch slope, D. & H. C. C., Providence,
30	50	Patrick Brady,	47	No. 4 shaft, Penna. C. Co., Jenkins township,
June 1	51	John Moore,	34	Green Ridge shaft, J. J., Scranton City,
1	52	John Mason,		Marvin shaft, D. & H. C. Co., Providence,
3	53	John Evans,	50	Bellevue slope, D., L. & W. R. R. Co., Lackawanna tp.,
8	54	John Nallin,	45	Taylor shaft, D., L. & W. R. R. Co., Taylorvile,
14	55	Richard Petigrew,	33	Eddy Creek shaft, D. & H. C. Co., Olyphant,
18	56	Joshua Davies,	40	Mosier shaft, B. C. Co., Hughestown borough,
21	57	Gomer Morgan,	32	School Fund slope, S. F. A., Hyde Park,
21	58	Henry Harris,	16	Taylor shaft, D., L. & W. R. R. Co., Taylorville,
30	59	George Williams,		Filer colliery, F. & S., Winton borough,
July 7	60	Henry Matters,	24	Pancost colliery, Pancost C. Co., Dunmore,
7	61	Job Williams,	33	do. do. do.
7	62	John Youngblood,	23	Taylor shaft, D., L. & W. R. R. Co., Taylorville,
9	63	John Llewelyn,	50	Dodge shaft, D., L. & W. R. R. Co., Lackawanna tp.,
12	64	Jeremiah Thomas,	25	No. 2 Diamond shaft, D., L. & W. R. R. Co., Hyde Park,
12	65	Michael Smith,	34	Brisbin shaft, D., L. & W. R. R. Co., Providence,
13	66	Patrick Gilhool,	15	White Oak colliery, D. & H. C. Co., Archbald,
14	67	Anthony Robertson,	10	Legitt's reek shaft, D. & H. C. Co., Providence,
15	68	James Hall, sr.,	47	Phœnix shaft, Ph. C. Co., Ransom township,
15	79	Thomas Hall,	19	do. do. do.
22	70	William Llewelyn,	39	Cayuga shaft, D., L. & W. R. R. Co., Providence,
22	71	Maurice Weeks,	28	No. 10 shaft, Penna. C. Co., Hughestown borough,
26	72	John Hinds,		Grassy Island shaft, D. & H. C. Co., Archbald,

District of the Wyoming coal fields, Luzerne and Carbon counties, now including Pennsylvania, and the cause as shown by his investigation, for the year ending December, A. D. 1881.

Nature or Cause of Death or Accident.	No. of accidents.
Injured by an explosion of a blast while tamping a hole,	1
Foot and ankle slightly injured by a water-pipe falling from a car and bounding against him,	2
Face and hands slightly burned by an explosion of an 8-inch cartridge of powder,	3
Back slightly injured by a fall of roof,	4
Back and shoulder slightly cut by a fall of top-coal,	5
Hips slightly injured by a fall of top-coal,	6
Slightly injured by a fall of roof,	7
Leg badly bruised between bumpers of mine cars,	8
Toe cut off by shaft carriage at the bottom,	9
Slightly injured in the back by piece of ice falling down the shaft,	10
Body injured by being squeezed between a car and pillar,	11
Body injured by being squeezed between a car and sheeve-wheel on top of plane,	12
Hip and leg slightly injured by a fall of roof,	13
Body injured by being squeezed between a car and pillar,	14
Head squeezed between mine cars,	15
Elbow dislocated and arm bruised by falling under a mine car,	16
Face and hands slightly burned by an explosion of $C. H_4$ gas,	17
Teeth knocked loose and tongue cut by a lever used in putting car on track knocking him,	18
Back slightly injured by a fall of roof,	19
Wrist cut by a fall of roof,	20
Leg bruised between bumpers of mine cars,	21
Foot injured by a piece of coal falling on it which he was barring down,	22
Body slightly injured by a fall of rock,	23
System shocked by falling down a chute in the breaker,	24
Squeezed between mine cars while uncoupling his mule,	25
Body injured between a car and a prop,	26
Fingers bruised while unhitching mule from car,	27
Head slightly injured by a piece of coal falling down the air shaft,	28
Head slightly injured by a piece of coal falling down the air shaft,	29
Hips injured by a fall of top-coal; through his own neglect,	30
Leg bruised by a fall of coal,	31
System severely shocked by an explosion of giant powder,	32
Slightly burned by an explosion of gas,	33
Finger crushed under wheel of mine car,	34
Ankle slightly injured by a fall of roof,	35
Face and hands burned by an explosion of powder,	36
Finger crushed between a car and a prop-timber on another car,	37
Face and hands slightly burned by an explosion of gas,	38
Back slightly injured by a fall of black-rock,	39
Slightly injured by a fall of roof,	40
Head cut and squeezed between cars while they were in motion,	41
Ankle sprained by being struck by a stretcher,	42
Knee slightly injured by being caught between a car and a prop,	43
Leg slightly bruised by being caught between locomotive and mine car,	44
Burned slightly by an explosion of about six inches of powder,	45
Head injured by a fall of roof,	46
Hand cut and bruised by a fall of roof while preparing to stand a prop,	47
Head slightly injured by a fall of a small portion of roof,	48
Finger smashed while hitching stretcher on a car,	49
Back and ribs injured by a fall of roof,	50
Back and thigh injured by a fall of roof,	51
Body and legs bruised by coal flying from a blast,	52
Hips bruised by coal flying from a blast,	53
Legs slightly injured by mine cars; through his own negligence,	54
Slightly injured by a premature blast ignited by a blower of gas,	55
Face and arm slightly bruised by an explosion of powder,	56
Ankle dislocated by a fall of roof,	57
Stomach injured by a kick from a mule,	58
Foot slightly injured by a fall of roof,	59
Both men were sorely bruised about the body and nearly suffocated by a fall of earth in a new slope sinking; caused by a collar breaking through the neglect of James Vasey, the contractor,	60, 61
Back slightly injured by a fall of roof,	62
Head, face, back, and leg injured by a fall of roof,	63
Hip injured,	64
Ilip slightly injured by a fall of rock interlying benches of coal,	65
Abdomen injured slightly by being kicked by a mule,	66
Body burned or scalded by escaping steam; caused by his tampering with a valve on steam pipe,	67
Both men were burned on face and hands by an explosion of powder: in inserting a cartridge in a hole it broke, when they gathered the loose powder in a hat and a spark set it off,	68, 69
Bruised on right side, hips, and legs by a blast fired in an entrance without warning,	70
Hips injured by a fall of top coal which he was barring down,	71
Body slightly injured by being squeezed between mine cars,	72

TABLE No. 3—

Date.	No. of accidents.	NAME.	Age.	Colliery where Accident Occurred.
July 28	73	John Joyce,		Marvin shaft, D. & H. C. Co., Providence,
30	74	John Lynch,	30	Brisbin shaft, D., L. & W. R. R. Co., Providence,
Aug. 1	75	Thomas Nolan,	40	do. do. do.
2	76	John Sammon,	35	No. 10 shaft, Penn'a C. Co., Hughestown borough,
3	77	Anthony Curran,	18	Law shaft, Penn'a C. Co., Pleasant Valley,
4	78	John Early,	45	Roaring Brook shaft, R. B. C. Co., Dunmore,
4	79	John Davies,		Hillside colliery, H. C. & I. Co., Pleasant Valley,
9	80	Patrick Loftus,	32	No. 5 shaft, Penn'a C. Co., Jenkins township,
10	81	John Jeffreys,	14	Brisbin shaft, D., L. & W. R. R. Co., Providence,
11	82	Barney Foster,	18	do. do. do.
12	83	Walter Griffiths,	16	Archbald shaft, D., L. & W. R. R., Lackawanna twp.
17	84	Charles Doran,		No. 12 shaft, Penn'a C. Co., Pleasant Valley,
17	85	Patrick O'Boyle,		do. do. do.
17	86	Henry Gerbig,	28	White Oak colliery, D. & H. C. C., Archbald,
20	87	Lewis W. Lewis,	52	Capouse shaft, L. I. & C. Co., Hyde Park,
22	88	Peter Henigan,	25	Mosier shaft, B. C. Co., Hughestown borough,
21	89	Frank Devitt,	36	No. 7 shaft, Penn'a C. Co., Jenkins township,
24	90	John Davies,	25	No. 2 Diamond shaft, D., L. & W. R. R., Hyde Park,
26	91	Patrick Leonard,	20	Von Storch slope, D. & H. C. Co., Providence,
26	92	Michael Costello,	40	do. do. do.
27	93	William Decker,	25	Law shaft, Penn'a C. Co., Pleasant Valley,
30	94	Martin McDermott,	14	Sloan shaft, D., L. & W. R. R. Co., Lackawanna twp.,
Sept. 6	95	Richard Edwards,	16	Sibley shaft, P. A. C. Co., Old Forge township,
8	96	Rosser Jenkins,	45	Dodge shaft, D., L. & W. R. R. Co., Lackawanna twp.,
8	97	James Bambrick,	52	Twin shaft, Pittston C. Co., Pittston,
9	98	Peter Larkin,	15	No. 3 shaft, D. & H. C. Co., Carbondale City,
10	99	Thomas Roderick,	21	Continental shaft, D., L. & W. R. R. Co., Lack'a twp.,
13	100	James Gaughan,	40	No. 6 slope, Penn'a C. Co., Hughestown borough,
19	101	Peter Joyce,	11	Seneca slope, Pittston C. Co., Pittston,
22	102	Frank Duffy,	30	No. 10 shaft, Penn'a C. Co., Hughestown borough,
22	103	Chester Knupp,	30	do. do. do.
27	104	Thomas Kenney,	39	Hampton shaft, D., L. & W. Co., Lackawanna twp.,
27	105	James Gibson,	23	do. do. do.
28	106	A. G. Horan,	37	Coal Brook colliery, D. & H. C. Co., Carbondale,
30	107	Richard Reese,	43	Central shaft, D., L. & W. R. R. Co., Hyde Park,
30	108	Reese Lloyd,	53	do. do. do.
30	109	William Gable,	26	do. do. do.
30	110	John Williams,	40	do. do. do.
Oct. 6	111	Anthony Coggins,	14	No. 7 shaft, Penn'a C. Co., Junkins township,
7	112	Charles Schalong,	45	Jermyn, No. 3 shaft, J. Jermyn, Scranton,
8	113	William Thomas,	39	Hyde Park shaft, D., L. & W. R. R. Co., Hyde Park,
10	114	Michael Tegne,	15	Jermyn, No. 3 shaft, J. Jermyn, Scranton,
10	115	Patrick Mitchell,	50	Fairmount shaft, A. M. & Co., Pittston,
10	116	George Austin,		No. 6 shaft, Penn'a C. Co., Jenkins township,
12	117	Cornelius Evans,	42	No. 11 shaft, Penn'a C. Co., Jenkins township,
12	118	Albert Robinson,	32	Pancost slope, P. C. Co., Dickson City,
13	119	Martin Lally,	28	Taylor shaft, D., L. & W. R. R. Co., Taylorville,
13	120	John Robinson,		Marvin shaft, D. & H. Co., Providence,
13	121	Edward Gilmartin,	23	Butler shaft, B. C. Co., Pittston township,
14	122	Thomas Coursey,	13	Von Storch slope, D. & H. Co., Providence,
14	123	Thomas Harrington,		Marvin shaft, D. & H. C. Co., Providence,
14	124	James Nicholson,	21	Jermyn slope, John Jermyn, Jermyn borough,
14	125	John P. Nicholson,	39	do. do. do.
15	126	Patrick Scanlon,	60	White Oak colliery, D. & H. C. Co., Archbald,
15	127	Michael Scanlon,	26	do. do. do.
15	128	John O. Thomas,	35	Pierce colliery, Pierce C. Co., Archbald,
15	129	Patrick McCabe,	27	do. do. do.
17	130	William Gilbert,	32	Legitt's Creek shaft, D. & H. C. Co., Providence,
19	131	John Mulroy,	16	Brisbin shaft, D., L. & W. R. R. Co., Providence,
20	132	John Walsh,		White Oak colliery, D. & H. C. Co., Archbald,
22	133	John Ginty,	45	Eddy Creek, D. & H. C. Co., Olyphant,
24	134	David Valley,	35	No. 6 shaft, Penn'a C. Co., Junkins township,
26	135	John Hunt,	38	Green Ridge slope, G. R. C. Co., Dunmore,
27	136	James Sweeney,	23	No. 6 shaft, Penn'a C. Co., Junkins township,
27	137	James Gilvarry,	25	Von Storch slope, D. & H. C. Co., Providence,
28	138	Samuel Price,	24	Mount Pleasant slope, M. P. C. Co., Hyde Park,
28	139	Bartley Lee,	50	No. 2 G. vein, Diamond mine, D., L. & W., Hyde Park,
29	140	James Gallagher,	14	Legitt's Creek shaft, D. & H. C. Co., Providence,
Nov. 1	141	John Biglin,	50	Fair Lawn slope, F. L. C. Co., Scranton,
1	142	Peter Regger,		Mount Pleasant slope, M. P. C. C., Hyde Park,
2	143	John Kearney,	35	Easton colliery, J. S. & Co., Archbald,
3	144	John Jones,	50	Legitt's Creek shaft, D. & H. C. Co., Providence,
3	145	Martin Mullin,	14	Central shaft, D., L. & W. R. R. Co., Hyde Park,
5	146	Reese Richards,	18	Spring Brook colliery, H. C. & I. Co., Moosic,

Continued.

Nature or Cause of Death or Accident.	No. of accidents.
Leg bruised between mine cars,	73
Side slightly injured by a fall of bony coal,	74
Scalp wound by a fall of roof,	75
Knee bruised by a lever used to lift a car on the track slipping and striking him,	76
Head slightly injured by a fall of roof,	77
Face cut by being knocked down into a pile of coal by a slight fall of roof,	78
Head injured by coal flying from a blast to which he returned, thinking it had missed fire,	79
Shoulders slightly injured by a fall of black rock,	80
Back injured by falling off a mule's back,	81
Face slightly burned by an explosion of powder; ignited by a spark from his lamp,	82
Face injured by a kick from a mule,	83
Both men slightly injured by a fall of roof,	84, 85
Face and hands bruised by a premature explosion of a blast while stemming the hole,	86
Head cut by a fall of bony which he was barring down,	87
Back and leg slightly injured by a fall of top coal,	88
Side injured by a fall of roof,	89
Slightly injured by a fall of rock lying between the bottom and top coal,	90
Both men were considerably bruised by being thrown by an explosion of CH_4 gas,	91, 92
Head cut and hip bruised by a fall of rock from middle of the coal,	93
Slightly injured by being caught between a car and prop,	94
Head injured slightly by a kick from a mule,	95
Back and leg injured by a fall of roof,	96
Arm cut and eyes injured by a premature blast,	97
Slightly injured by being squeezed between mule and a mine car,	98
Temple cut by coal flying from a car which he was spragging,	99
Back slightly injured by a fall of rider coal,	100
Back bruised by falling under pea coal car at the breaker,	101
Leg bruised from ankle to knee by a fall of rider coal,	102
Arm injured between a car and prop,	103
Arm slightly injured—flesh wound—by a fall of roof immediately after firing a blast,	104
Leg bruised by the same fall of roof,	105
Back and breast bruised by a fall of coal immediately after firing a blast,	106
Each of these men were more or less burned in the face and hands by an explosion of carbureted hydrogen gas, caused by a fall of a piece rock. None of them are severely injured,	107, 108
Williams being the worst, and he will be back to work in nine days, or two weeks at furthest.	109
David Vaughn is to blame for the explosion,	110
Foot caught between the hoisting carriage and carriage seat at bottom of shaft,	111
Slightly burned by firing carbureted hydrogen gas in pile of loose coal,	112
Injured by a fall of slate,	113
Slightly injured; arm caught under wheel of car when in the act of spragging,	114
Slightly injured by flying coal from a blast,	115
Finger taken off by a piece of coal falling down the shaft,	116
Slightly burned by an explosion of fire-damp,	117
Slightly injured by fall of slate in face of slope,	118
Slightly injured by fall of roof,	119
Shoulder dislocated by falling down while in the act of putting a car on the track,	120
Slightly injured by being caught between two cars,	121
Slightly injured by being kicked by a mule,	122
Slightly injured by being caught between two cars,	123
Ankle badly bruised by a fall of roof,	124
Shoulder badly bruised by a fall of roof,	125
Slightly injured by getting hit by coal flying from a blast,	126
Slightly injured by getting hit by coal flying from a blast,	127
Slightly injured by a fall of top coal,	128
Slightly injured by a fall of top coal,	129
Slightly injured by a fall of rock roof,	130
Injured by being thrown off a mule,	131
Slightly injured by being thrown off a culm car,	132
Slightly injured by an explosion of fire-damp,	133
Slightly injured by a loaded car getting off the track,	134
Injured by an explosion of powder,	135
Injured by riding on car; his head hit the roof,	136
Injured by a premature blast,	137
Injured by a premature blast,	138
Injured by a fall of roof,	139
Injured by being caught by a car,	140
Slightly injured by a fall of roof,	141
Slightly injured by a fall of roof,	142
Slightly injured by an explosion of powder; caused by letting spark drop into keg,	143
Injured by getting his foot caught by a car wheel in mines,	144
Injured by getting kicked by a mule,	145
Slightly injured by a fall of rock,	146

TABLE No. 3—

Date.	No. of accidents.	NAMES.	Age.	Colliery where Accident Occurred.
Nov. 8	147	Richard O'Malia, . . .	boy	Hillside colliery, H. C. & I. Co., Pleasant Valley, . .
9	148	Stephen Nash, ...	39	Sloan shaft, D., L. & W. R. R. Co., Lackawanna twp.
9	149	John Maguire, ...	14	Seneca slope, Pittston C. Co., Pittston, ...
12	150	Peter Mahon, ...	40	No. 2, Diamond slope, D., L. & W. R. R., Hyde Park,
12	151	John Nealis, ...	40	do. do. do.
15	152	Daniel Kilbride, . . .	17	Law shaft, Penna. C. Co., Pleasant Valley, ...
17	153	Thomas Peel, . . .	18	Jermyn No. 3 shaft, J. Jermyn, Scranton, ...
21	154	Michael Burger, ...	22	Taylor shaft, D., L. & W. R. R. Co., Taylorville, . .
21	155	William Armson, . . .	20	Marvin shaft, D. & H. C. Co., Providence, ...
22	156	Richard Harlow, . . .	45	Mt. Pleasant slope, M. P. C. Co., Hyde Park, ...
23	157	William Morris, . . .	45	Dodge shaft, D., L. & W. R. R. Co., Lackawanna twp.
25	158	John Gibson, ...	17	Central shaft, D., L. & W. R. R. Co., Hyde Park, .
25	159	Michael Mullin, ...	15	Fair Lawn slope, F. L. C. Co., Scranton, ...
26	160	Michael Clark, ...	44	do. do. . . . .
26	161	John Martin, ...	18	No. 8 shaft, Penna. C. Co., Hughestown borough, .
28	162	James Golightly, . . .	. .	Marvin shaft, D. & H. C. Co., Providence, ...
28	163	Anthony Connor, . . .	40	Coal Brook colliery, D. & H. C. Co., Carbondale, . .
28	164	John Connor, ...	19	do. do. do. .
Dec. 1	165	Alfred Hatton, ...	41	Archibald shaft, D., L. & W. R. R., Lackawanna twp.
7	166	James Murphy, ...	15	Mt. Pleasant slope, M. P. C. Co., Hyde Park, ...
7	167	John Bolin, ...	15	Barnum shaft, Penna. C. Co., Pittston, ...
9	168	Michael Fisher, ...	39	Twin shaft, Pittston C. Co., Pittston, ...
10	169	William Burns, ...	42	Taylor shaft, D., L. & W. R. R. Co., Taylorville, . .
14	170	John Handley, ...	50	No. 1 shaft, D. & H. C. Co., Carbondale city, . . .
15	171	James Brown, ...	26	No. 9 shaft, Penna. C. Co., Pittston, ...
20	172	Patrick O'Brien, . . .	15	Law shaft, Penna. C. Co., Pleasant Valley, ...
21	173	Frederick Mains, . . .	13	Von Storch breaker, D. & H. C. Co., Providence, . .
21	174	Patrick McNish, .	38	Legitt's Creek shaft, D. & H. C. Co., Providence, . .
29	175	Charles Devine, ...	25	Heidelberg shaft, L. V. C. Co., Pittston township,
30	176	Anthony Reap, ...	16	Hyde Park shaft, D., L. & W. R. R. Co., Hyde Park,

There were 176 slight accidents in the year 1881.

Continued.

Nature or Cause of Death or Accident.	No. of accidents.
Fingers shot off by handling of powder,	147
Got knocked down by trying to stop a mine car,	148
Slightly injured by being caught between the mule and pillar,	149
Both these men were slightly injured by fall of roof,	150
	151
Slightly injured; fingers caught while coupling cars,	152
Slightly injured by a fall of top coal,	153
Slightly injured by a fall of top coal,	154
Injured by a mine car running on to him, (not serious,)	155
Injured by a fall of rock, (not serious,)	156
Slightly injured by an explosion of fire-damp,	157
Injured; slipped and fell under a mine car,	158
Injured by being caught between a mine car and prop,	159
Injured by a mine car running against a door which he was working at,	160
Injured by a piece of coal falling on his leg, from top of mine car that he was loading,	161
Slightly injured by slipping and falling down while working in chamber,	162
Both these men were slightly injured by a piece of coal falling on top of car, it broke and slid	163
down, a portion on each side, injuring them slightly,	164
Injured by a fall of blacksmith bench of coal, (not serious,)	165
Slightly injured; jammed between empty car and a door in mines,	166
Slightly injured while coming up the shaft on the safety carriage,	167
Wrist slightly cut by a flying piece of coal from a blast,	168
Slightly injured by a fall of coal,	169
Slightly injured by a fall of roof,	170
Slightly injured by a fall of rider coal,	171
Severely bruised by falling in front of a car which run on to him, (not serious,)	172
Slightly injured by a runaway car, on culm dump,	173
Slightly injured by a fall of bone coal,	174
Slightly injured by getting hit by a piece of flying coal from a blast,	175
Slightly injured by being kicked by a mule,	176

TABLE No. 1.—*The number of each class of employés at each colliery in the and a portion of Wayne and Susquehanna counties,*

MISCELLANEOUS

NAMES OF THE COLLIERIES.	NUMBER OF PERSONS EMPLOYED INSIDE.						
	Bosses.	Miners.	Laborers.	All company men.	Drivers and runners	Door boys.	Total inside.
1. Everhart,	1	27	29	4	12	1	74
2. Tompkin's shaft,	1	21	17	2	8	1	50
3. Fairmount shaft,	1	42	42	7	11	9	112
4. Seneca slope,	3	40	30	20	14	4	111
5. Twin shaft,	3	34	33	7	12	5	94
6. Beaver slope,	1	8	8	5	4	1	27
7. Butler shaft,	1	34	31	4	14	3	90
8. Mosier shaft,	1	34	27	6	8	3	79
9. Heidelberg shaft,	1						1
10. Phœnix shaft,	1	34	30	12	14	4	95
11. Columbia,	1	11	11	1	3	1	28
12. Stetler shaft,	2	18	sinking	shaft,			20
13. Hillside,	1	40	40	18	26	11	136
14. Spring Brook,	1	52	35	20	39	12	159
15. Greenwood,	2	93	52	33	47	17	244
16. Sibley shaft,	1	60	20	14	20	7	122
17. National,	1	101	49	22	45	18	236
18. Meadow Brook,	1	80	47	23	43	17	211
19. School Fund slope,	2	31	31	10	14	6	94
20. Mount Pleasant slope,	1	58	58	10	25	12	164
21. Capouse shaft,	1	141	140	33	50	30	395
22. Pine Brook shaft,	1	30	30	13	13	10	97
23. Fair Lawn slope,	1	25	30	12	10	5	83
24. Germyn's Green Ridge shaft,	1	85	85	18	34	14	237
25. Green Ridge slope,	2	65	60	16	40	15	198
26. Roaring Brook shaft,	1	26	26	12	33	10	108
27. Lucas shaft,		30	sinking	shaft,			30
28. Elk Hill,	1	43	18	6	17		85
29. Pancost Coal Company,	1	8	8	2	2		21
30. Troop shaft,	1	52	sinking	shaft,			53
31. Lackawanna Coal Company,	1	30	sinking	shaft,			31
32. Filer's shaft and slope,	1	158	40	20	47	8	274
33. Pierce Coal Company,	1	95	95	20	30	6	247
34. Eaton,	1	134	10	12	33	7	197
35. Jermyn, No. 1, shaft,	1	96	38	20	34	6	195
36. Jermyn's slope,	1	39	10	9	10	3	72
37. Erie shaft,	1	101	15	18	25	11	171
38. Belmont,	1	28	28	2	7	2	68
39. Elk Creek,	1	10	10	1	2		24
40. Forest City,	1	16	3	2	7	2	31
	47	2,030	1,239	434	753	261	4,764

PENNSYLVANIA

41. Slope No. 2,	1	27	28	11	12	1	80
42. Shaft No. 6,	1	38	27	14	19	6	105
43. Shaft No. 5,	1	38	36	9	15	7	106
44. Shaft No. 11,		19	18	5	10	3	55
45. Shaft No. 4,	1	51	47	10	19	7	135
46. Slope No. 4,	1	44	43	8	16	2	114
47. Shaft No. 7,	1	46	46	14	20	5	132
48. Slope No. 6,		19	16	4	7	1	47
49. Shaft No. 8,	1	42	37	9	11	2	102
50. Shaft No. 1,		20	18	3	4	1	46
51. Shaft No. 10,	2	83	69	19	30	12	215
52. Shaft No. 9,	1	36	35	9	11	2	94
53. Tunnel No. 1,	1	38	11	6	6	3	65
54. Barnum shaft,	2	114	112	21	25	11	285
55. Law shaft,	1	36	36	13	13	5	104
56. No. 12 shaft,	1	40	40	7	13	4	105
57. Stark colliery,	1	50	24	13	13	5	106
58. Shaft No. 13,	1	14	10	5	5	2	37
59. Shaft No. 2, Dunmore,	1	36	38	8	9	7	99

Eastern district of Luzerne and Carbon counties, now including all of Lackawanna for year ending 31st day of December, A. D. 1881.

COAL COMPANIES.

NUMBER OF PERSONS EMPLOYED OUTSIDE.													
Bosses.	Mechanics.	Head and plate men.	All company men.	Drivers and runners.	Slate pickers.	Total outside.	Total inside and outside.	Number of horses and mules.	Number of tons of coal mined in 1881.	Number of tons mined for each miner employed in mines.	Number of tons mined for each person employed in mines.	Number days worked in 1881.	No. of colliery.
1	5	6	2	7	28	49	123	12	56 861	. . . .	. . . .	. . . .	1
1	3	3	3	2	16	28	78	7	13.889	. . . .	. . .	. .	2
1	2	6	4	2	30	45	157	9	53.878	. . . .	. . .	. .	3
1	4	10	14	4	36	69	180	21	54.270	. . . .	. . . .	. .	4
1	2	5	15	4	42	69	163	12	33 546	. . .	. . . .	. .	5
1	2	.	.	2	5	32	4	16.029	. . . .	. . .	. .	6
1	5	7	9	3	42	67	157	19	63 326	. . .	. .	. .	7
1	4	8	7	1	35	56	135	8	52.200	. . . .	. .	. .	8
1	.	.	.	.	1	2	3	2 000	. . . .	.	.	9
1	5	4	7	2	40	59	154	21	36, 112	. . . .	.	.	10
1	3	1	3	1	10	19	47	5	15, 605	. . .	.	.	11
1	4	.	6	.	.	11	31	4	.	. . . .	.	.	12
1	4	10	20	10	30	75	211	37	62 624	. .	. .	.	13
1	7	5	25	5	46	89	248	38	90.590	.	.	.	14
2	5	8	75	12	65	166	410	47	149 013	. .	.	.	15
1	4	5	30	2	40	82	204	19	76 871	. .	.	.	16
1	5	7	9	4	70	96	332	26	124 004	.	.	.	17
1	10	6	26	8	70	121	332	30	116 431	. . . .	.	.	18
1	3	7	14	5	54	84	178	24	56 700	.	.	.	19
1	5	8	20	4	79	117	281	38	123 716	.	.	.	20
1	16	9	36	4	45	111	506	75	276 840	. . . .	. .	. .	21
1	5	4	8	1	18	37	134	28	13, 481	. . .	. .	.	22
2	5	5	12	5	46	75	158	17	53 056	.	. .	.	23
1	7	7	21	5	54	95	332	32	181.514	.	.	. .	24
1	8	12	12	4	65	102	300	.	126.831	. .	. .	. .	25
1	8	4	10	6	32	61	169	62	90.000	.	.	. .	26
1	20	at new	breaker,	.	.	21	50	. .	.	.	.	27
1	3	3	12	1	22	42	127	22	50, 107	. .	.	.	.	28
1	40	.	.	.	.	41	62	20	. .	.	.	.	29
1	58	building new breaker,	.	.	.	59	112	12	. . .	.	.	.	30
1	28	building new breaker,	.	.	.	29	60	4	. .	.	.	.	31
2	5	19	48	51	60	139	413	46	132.720	.	. .	.	32
1	8	7	25	5	78	124	371	20	130.000	. .	.	.	33
1	5	6	21	4	42	79	276	45	108 193	.	. .	.	34
1	8	6	40	3	47	104	299	27	118.481	.	.	.	35
1	5	4	15	3	12	40	112	13	34.840	.	. .	.	36
1	3	9	21	1	33	68	239	34	79 411	. .	.	.	37
1	3	.	8	1	20	33	101	6	4 856	.	.	.	38
.	2	3	4	4	10	23	37	5	17 838	. .	. .	.	39
1	2	1	3	2	4	13	44	11	19.856	.	.	.	40
42	321	205	585	130	1,323	2,606	7 370	873	2,635 689				

COAL COMPANY.

1	5	3	8	.	1	18	98	15	49.504	. .	.	.	41
. .	4	3	13	1	34	55	160	25	56.874	. .	.	.	42
1	3	3	12	5	36	60	166	19	71.270	.	.	.	43
.	2	2	5	1	17	27	82	12	36 280	.	.	.	44
1	4	3	11	.	1	20	155	20	90.515	.	.	.	45
1	5	5	9	7	. .	27	141	26	71 962	. . . .	. .	. .	46
1	6	1	18	.	2	28	160	20	94.625	.	.	.	47
.	1	3	2	2	10	18	65	8	27.826	. . .	. . .	. .	48
.	3	3	11	4	22	43	145	11	60.686	.	. . .	. .	49
1	1	2	3	2	11	20	66	6	29.477	. .	. . .	. .	50
.	8	6	26	2	54	96	311	37	126.130	.	.	. .	51
1	2	3	10	3	26	45	139	14	69 323	. .	.	. .	52
1	3	5	6	1	1	17	82	7	40.878	. .	. .	. .	53
1	9	17	18	6	64	115	400	28	173 287	. .	. .	. .	54
. .	5	3	11	4	21	44	148	13	68 801	. .	. .	. .	55
1	4	3	13	2	22	45	150	14	76 975	. .	. .	. .	56
1	6	6	13	3	33	62	168	18	73 263	. .	. .	. .	57
.	2	3	5	4	8	22	59	14	24.135	. .	.	. .	58
1	1	6	4	.	. .	12	111	10	53.407	. .	. .	. .	59

TABLE No. 4—

PENNSYLVANIA COAL

NAMES OF THE COLLIERIES.	NUMBER OF PERSONS EMPLOYED INSIDE.						
	Bosses.	Miners.	Laborers.	All company men.	Drivers and runners.	Door boys.	Total inside.
60. Gypsy Grove, Dunmore,	1	76	74	9	29	12	201
61. No. 2 breaker, Pittston,							
62. Central breaker,							
63. Dunmore breaker,							
64. Dunmore screens,							
65. Miscellaneous, not included above,							
	19	867	765	197	287	98	2,233
DELAWARE, LACKAWANNA AND							
66. Pyne shaft,	1	89	67	14	44	7	222
67. Taylor shaft and drift,	1	85	80	24	34	14	238
68. Archbald shaft,	1	59	47	13	18	3	141
69. Sloan shaft,	1	80	25	19	23	6	154
70. Continental shaft,	1	56	56	19	15	4	151
71. Hampton shaft,	1	96	75	33	40	10	255
72. Central shaft,	1	86	75	23	30	9	224
73. Hyde Park shaft,	1	78	70	21	28	5	203
74. Bellevue shaft and slope,	2	92	92	28	27	4	245
75. Scranton Coal Company slope,				11			11
76. Oxford shaft,				10			10
77. Dodge shaft,	1	79	60	17	27	4	188
78. Diamond No. 2 shaft,	2	93	93	28	47	8	271
79. Diamond No. 2 slope,	1	42	40	17	22	5	127
80. Tripp's slope,	1	38	33	19	29	3	123
81. Brisbin shaft,	1	83	70	18	31	9	212
82. Cayuga shaft,	1	72	63	21	41	4	202
83. Miscellaneous, not included above,				16			
	17	1,128	946	351	456	95	2,993
DELAWARE AND HUDSON							
84. Von Storch slope,	1	130	115	71	81	16	414
85. Legit's Creek shaft,	1	96	60	25	50	16	248
86. Marvin shaft,	1	96	62	24	48	12	243
87. Olyphant No. 2,	1	90	30	17	32	6	176
88. Grassy Island shaft,	1	104	60	23	37	16	241
89. White Oak,	1	89	36	14	34	12	186
90. No. 1 shaft,	1	136	60	14	35	7	253
91. No. 3 shaft,	1	49	13	10	24	7	104
92. Coal Brook,	1	160	57	16	56	16	306
93. Racket Brook breaker,							
94. Miscellaneous, not included above,							
	9	950	493	214	397	108	2,171
RECAPIT							
95. Miscellaneous coal companies,	47	2 030	1 239	434	753	261	4,764
96. Pennsylvania Coal Company,	19	867	765	197	287	98	2 233
97. Delaware, Lackawanna and Western Railroad Company,	17	1 128	946	351	456	95	2,993
98. Delaware and Hudson Canal Co.,	9	950	493	214	397	108	2,171
99. Local coal sale mines,							110
	92	4,975	3,443	1,196	1 893	562	12,271

Add for home consumption, steam power at mines, &c., &c., 5 per cent. of number of tons mined,

Total coal mined,

Continued.

COMPANY—Continued.

NUMBER OF PERSONS EMPLOYED OUTSIDE.							Total inside and outside.	Number of horses and mules.	Number of tons of coal mined in 1881.	Number of tons mined for each miner employed in mine.	Number of tons mined for each person employed in mines.	Number days worked in 1881.	No. of colliery.
Bosses.	Mechanics.	Head and plate men.	All company men.	Drivers and runners.	Slate pickers.	Total outside.							
3	1	11	19	6	22	62	263	29	113,596	....	....	....	60
....	....	.	14	....	57	.	71	...	...	....	....	....	61
....	....	6	14	5	46	77	71	.	.....	....	....	....	62
....	....	....	12	4	37	53	53	.	.....	..	....	....	63
....	....	9	28	3	36	76	76	.	.....	...	....	....	64
4	23	.	62	1	....	90	90	77	.	.	....	....	65
19	98	106	347	66	561	1,197	3,430	423	1,407,814	1 624	630	255.8	

WESTERN RAILROAD COMPANY.

1	7	6	34	10	58	116	338	49	167 667	....	....	....	66
1	11	7	22	7	80	128	366	90	149,358	....	....	....	67
1	12	6	20	3	71	113	254	27	79 565	....	....	....	68
1	7	6	22	4	50	90	244	43	119 126	....	....	....	69
1	8	9	27	5	49	99	250	30	48 242	....	....	....	70
1	10	15	31	7	78	142	397	63	190 471	....	....	....	71
1	9	6	26	5	56	103	327	47	138.769	....	....	....	72
1	7	8	24	5	65	110	313	40	142.670	....	....	....	73
1	12	13	34	10	110	180	425	63	165,486	....	....	....	74
....	7	.	20	....		27	38	6	.	....	....	....	75
....	4		6	..		10	20	9		....	....	....	76
1	8	14	17	7	75	122	310	48	140.917	....	....	....	77
1	15	8	40	19	87	170	441	}	} 181 224	..	.	.	78
...	10	6	27	10	53	106	233	195	81,402	..	..	.	79
....	....	.			.		123	}	} 69,017	..	.	.	80
1	7	9	28	4	51	100	312	58	145 251	..	..	.	81
1	7	7	23	4	48	90	292	43	107,014	..	.	.	82
.	87	.		.		87	103		.	.	.	.	83
13	228	120	401	100	931	1,793	4,786	811	1,926,177	1,707	644	227.6	

CANAL COMPANY.

1	8	15	43	7	70	144	558	52	237 756	....	....	....	84
1	7	6	38	2	60	114	362	38	137 289	....	....	....	85
1	9	12	27	3	33	85	323	43	165.627	....	....	....	86
1	8	9	34	4	56	112	288	33	105 239	....	....	....	87
1	7	10	28	7	65	118	359	38	142 283	....	....	..	88
1	6	5	22	6	50	90	276	31	123,480	.	....	....	89
1	6	8	10	2	4	31	284	26	25,923	.	....	..	90
1	5	7	4	1	2	20	124	12	6,182	...	....	....	91
1	11	..	39	13	56	131	440	54	220,639	..	.	.	92
1	2	5	13	7	50	78	78	3	175,339	..	..	.	93
1	32	.	.	.		33	33	. . .	. . .	....			94
11	101	91	258	52	446	959	3,130	320	1,339,758	1,410	617	232	

ULATION.

42	321	205	585	130	3,323	2,606	7,370	873	2,635,689	1,298	583		95
19	98	106	347	66	561	1,197	3,430	423	1 407,814	1,624	630	255.8	96
13	228	120	401	100	931	1,793	4,786	811	1,926,177	1,707	644	227.6	97
11	101	91	258	52	446	959	3,130	330	1,339,758	1,410	617	232	98
....	.	.	.	.		14	124	23	35,000	.			99
85	748	522	1,591	348	3 261	6 569	18 840	2,460	7,344,438				
. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	367,222				
. . . . .	. . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	7,711 660				

TABLE No. 5.—*A table of statistics connected with the working of Coal mines and Lackawanna, and a portion of Wayne and Susquehanna counties,*

MISCELLANEOUS

Number.	NAME OF COAL MINE OR COLLIERY.	Where Located.	By whom Operated.
1	Everhart colliery,	Jenkins township,	Waddell & Co.,
2	Tompkins shaft,	Pittston borough,	A. Tompkins,
3	Fairmount shaft,	Pittston township,	A Morris & Co.,
4	Seneca slope,	Pittston borough,	Pittston Coal Company,
5	Twin shaft,	"	" "
6	Beaver slope,	"	Waterman & Beaver,
7	Butler shaft,	Pittston township,	Butler Coal Company,
8	Mosier shaft,	Hughestown borough,	" "
9	Heidleberg shaft,	Pittston township,	Lehigh Valley Coal Company,
10	Phœnix shaft,	Pittston borough,	C. M. Sanderson & Co.,
11	Columbia,	Marcy township,	Grove Brothers,
12	Hillside shaft,	Pleasant Valley borough,	Hillside Coal and Iron Company,
13	Spring Brook,	Lackawanna township,	" "
14	Greenwood,	"	Pennsylvania Anthracite Coal Co.,
15	Sibley shaft,	Old Forge township,	" "
16	National,	Lackawanna township,	William Connell & Co.,
17	Meadow Brook,	Scranton city,	" "
18	School Fund,	Scranton city, Hyde Park,	School Fund Coal Association,
19	Mount Pleasant,	" "	Mount Pleasant Coal Company,
20	Capouse shaft,	" "	Lackawanna Iron and Coal Co.,
21	Pine Brook shaft,	Scranton city,	" "
22	Fairlawn slope,	"	Fairlawn Coal Company,
23	Jermyn's Green Ridge,	"	John Jermyn,
24	Green Ridge slope,	Dunmore borough,	Green Ridge Coal Co., (Limited,)
25	Roaring Brook shaft,	"	Roaring Brook Coal Company,
26	Elk Hill,	Dickson city,	Elk Hill Coal Company,
27	Filer's shaft and slope,	Winton borough,	Filer & Levey,
28	Pierce,	Archbald borough,	Pierce Coal Company,
29	Eaton,	"	Jones, Simpson & Co.,
30	Jermyn No. 1 shaft,	Jermyn borough,	John Jermyn, Esquire,
31	Jermyn slope,	"	" "
32	Erie shaft,	Greenwood borough,	Hillside Coal and Iron Company,
33	Belmont,	Carbondale city,	Butler Coal Company,
34	Elk Creek,	Fell township,	Brennan & Bridget,
35	Forest City,	Clifford twp., Susquehanna co	Hillside Coal and Iron Company,

PENNSYLVANIA

36	Slope No. 2,	Jenkins township,	Pennsylvania Coal Company,
37	Shaft No. 6,	"	" "
38	Shaft No. 5,	"	" "
39	Shaft No. 11,	"	" "
40	Shaft No. 7,	"	" "
41	Shaft No. 4,	Pittston borough,	" "
42	Slope No. 4,	Jenkins township,	" "
43	Tunnel No. 1,	Pittston township,	" "
44	Slope No. 6,	"	" "
45	Shaft No. 1,	"	" "
46	Shaft No. 8,	"	" "
47	Shaft No 9,	Hughestown borough,	" "
48	Shaft No, 10,	"	" "
49	Barnum Shaft,	Marcy township,	" "
50	Shaft No. 12,	Pleasant Valley borough,	" "
51	Shaft No. 13,	Old Forge township,	" "
52	Law shaft,	Pittston township,	" "
53	Stark shaft,	Lackawanna township,	" "
54	Shaft No. 2, Dunmore,	Dunmore borough,	" "
55	Gypsy Grove,	"	" "

DELAWARE, LACKAWANNA AND

56	Pyne shaft,	Lackawanna township,	Del., Lack'a and West'n R.R Co.,
57	Taylor shaft and drift,	"	" " "
58	Archbald shaft,	"	" " "

Collieries in the Eastern District of Luzerne and Carbon, now including all of State of Pennsylvania, for the year ending 31st day of December, A. D. 1881.

COAL COMPANIES.

Name of General Mine Superintendant and Assistants.	Name of Mining Boss.	Name of Outside Foreman.	Number.
Hon. Thomas Waddell	Elihu Smith,	William Mitchell,	1
D. Davis,	David W. Evans,	D. Davis,	2
A. Morris,	J. Abbott,	G. R. Smith,	3
Nelson Cowan,	Thomas Watkins,	P. O. Boyle,	4
"	M. J. Langan,	John Haston,	5
Daniel Edwards,	Fred. Burkert,	John J. Powell,	6
S. B. Bennett,	Adam John,	Robert Jaques,	7
"	William Neal,	G. H. Tench,	8
Fred. Mercur,	Henry Chapman,	A. G. Mason,	9
R. T. Bliss,	W. C. Noll,	R. T. Bliss,	10
Evan J. Evans,	Evan J. Evans,	W. G. Evans,	11
Samuel Hines, assisted by W. E. Colbourne	Joseph Davis,	Sylvester Biesecker,	12
	J. D. Davis,	J. D. Caryl,	13
Benjamin Reese,	Martin Ryan,	M. L. Coyne,	14
"	W. F. Courtwright,	A. F. Dond,	15
William Connell,	Thomas L. Jones,	Patrick Judge,	16
"	Samuel T. Jones,	John Connell,	17
A. B. Stevens,	John W. Davies,	D. P. Brooks,	18
William T. Smith,	James R. James,	Thomas D. Bevan,	19
Reese G. Brooks,	John Lovering,	Walter Hussey,	20
"	Reese R. Griffiths,	Henry Hess,	21
James P. Hosie,	Daniel Bradley,	James P. Hosie,	22
J. J. Jermyn,	Joseph D. Lloyd,	John Biglin,	23
O. S. Johnson,	Timothy Partrey,	W. S. Boyd,	24
John R. Davis,	P. H. Mongan,		25
William H. Richmond,	Patrick Riley,	W. J. White,	26
George Filer,	Richard D. Roberts,	M. E. Brown,	27
John H. Hosie,	Michael Grimes,	Alexander Craig,	28
Edward Jones,	James Eaton,	George W. Eaton,	29
John Jermyn,	Robert Carter,	John Knight,	30
"	Alfred Green,	Peter Merritt,	31
Samuel Hines, assisted by W. E. Colbourne.	Alexander Aikman,	William Walker,	32
Paul Burton,	David Williams,	Paul Burton,	33
Henry J. Brennan,	Henry J. Brennan,	Henry J. Brennan,	34
Samuel Hines, assisted by W. E. Colbourne,	Alexander McCan,	W. B. Williams,	35

COAL COMPANY.

William Law,	Henry Jopling,	John Glinn,	36
"	William Reynolds,	T. H. McMillan,	37
"	Benjamin Harding,	Peter J. Daley,	38
Andrew Bryden,	"	"	39
William Law,	William Reid,	John Portius,	40
Andrew Bryden,	Philip McCabe,	James Delaney,	41
"	James Watson,	Samuel McDowell,	42
William Law,	Samuel Bennett,	Thomas Hastie,	43
Andrew Bryden,	Alexander Thompson,	H. Fergusson,	44
"	"	Dalton Morse,	45
"	"	Hugh Fergusson,	46
"	Adam Harkness,	Cuthbert Snowden,	47
"	John Lewis and William Abbott,	"	48
"	James A. Bryden and Robert Bryden,	Anthony Horan,	49
William Law,	Robert McMillen,	Thomas Martin,	50
"	Thomas Wier,	"	51
"	John Allen,	G. M. Snyder,	52
"	Alexander Laird,	John Stilwell,	53
James Young,	John Moffatt,	John W. Marshall,	54
"	P. H. O'Hora,	William Jennings,	55

WESTERN RAILROAD COMPANY.

Benjamin Hughes,	John L. Lewis,	Adam Rheinhart,	56
Thomas D. Davis, assistant,	Morgan Harris,	John P. Cooper,	57
	Elijah Dagger,	John Fern,	58

TABLE No. 5—

Number.	Name of Coal Mine or Colliery.	Where located.	By whom operated.
59	Sloan Shaft,	Lackawanna township,	Del., Lack'a and West'n R. R. Co.,
60	Continental shaft,	"	" " "
61	Hampton shaft,	"	" " "
62	Bellevue shaft and slope,	"	" " "
63	Scranton Coal Co. slope,	"	" " "
64	Dodge shaft,	"	" " "
65	Central shaft,	Scranton, Hyde Park,	" " "
66	Hyde Park shaft,	"	" " "
67	Oxford shaft,	"	" " "
68	Diamond shaft No. 2,	"	" " "
69	Diamond slope No. 2,	"	" " "
70	Tripp's slope,	"	" " "
71	Brisbin shaft,	Scranton, Providence,	" " "
72	Cayuga shaft,	"	" " "

DELAWARE AND HUDSON

73	Von Storch slope,	Scranton, Providence,	Del. and Hudson Canal Co.,
74	Legit's Creek shaft,	"	" "
75	Marvin shaft,	"	" "
76	Olyphant No. 2,	Olyphant borough,	" "
77	Grassy Island shaft,	"	" "
78	White Oak,	Archbald borough,	" "
79	No. 1 shaft, Carbondale,	Carbondale city,	" "
80	No. 3 shaft, Carbondale,	"	" "
81	Coal Brook,	"	" "
82	Racket Brook breaker,	Carbondale township,	" "

Continued.

Name of General Mine Superintendant and Assistants.	Name of Mining Boss.	Name of Outside Foreman.	Number.
W. H. Storrs, outside superintendent,	John T. Williams,	John Reese,	59
	William Douse,	J. F. Green,	60
	Thomas Carson,	B. C. Green,	61
	John Hale and James Evans,	John M. Acker,	62
		John Hoffman,	63
	Edward James,	Edward E. Thomas,	64
William R. Storrs, Esq., general coal agent,	Lewis Roberts,	John A. Mears,	65
	David Mosier,	Robert Ruthven,	66
			67
	Reese T. Evans and Thomas Eynon,	Daniel Langstaff,	68
	Daniel Phillips,	"	69
	John Van Bergen,	"	70
	Frank Zimmerman,	D. E. Bell,	71
	Thomas Watkins,	Jacob C. Bowman,	72

CANAL COMPANY.

A. H. Vandling, Esq., superintendent coal department,	E. D. Jones,	C. W. Zeigler,	73
	Finlay Ross,	B. B. Atherton,	74
J. M. Chittenden, onside superintendent,	Jacob V. Birtley,	J. S. Atherton,	75
	Hugh Jones,	William Bell,	76
A. Nicol, general mine superintendent,	Andrew Patten,	Joseph G. Bell,	77
	James Nicol,	Thomas Law,	78
A. B. Nicol, assistant mine superintendent,	John Campbell,	William Bowers,	79
	John Hughes,	"	80
	William McMynn,	"	81
		Willlam P. E. Morss,	82

TABLE No. 5—

MISCELLANEOUS

Number.	Name of Coal Mine or Colliery.	Mode of Ventilation.	Dimensions of Fan. Diameter in feet.	Dimensions of Fan. Width of face in feet.	Revolutions of fan per minute.	Dimensions of furnace grate.
1	Everhart colliery,	Natural,				
2	Tompkins shaft,	Fan,	6½	3	195	
3	Fairmount shaft,	"	12	3⅓	80	
4	Seneca slope,	"	6	2½	200	
5	Twin shaft,	"	15	4½	60	
6	Beaver slope,	Natural,				
7	Butler shaft,	"				
8	Mosier shaft,	Fan,	16	4	50	
9	Heidleberg shaft,	"	20	4½	50	
10	Phœnix shaft,	"	14	4½	60	
11	Columbia,	Furnace,				20
12	Hillside shaft,	Fan,	14	4½	60	
13	Spring Brook,	"	11½	3¼	120	
14	Greenwood,	Four furnaces,				6x7½ 6x7½ 6x7½ 6x7½
15	Sibley shaft,	Fan,	16	5	90	
16	National,	Furnaces,				8x8 6x6
17	Meadow Brook,	Fan,	14	3½	100	
18	School Fund,	"	14	3½	65	
19	Mount Pleasant,	"	14	4	82	
20	Caponse shaft,	Fans,	9½ 20	2½ 4	140 65	
21	Pine Brook shaft,	Furnace,				7x6 7x6
22	Fairlawn slope,	Fan,	12	3	115	
23	Jermyn's Green Ridge,	"	20	5	75	
24	Green Ridge slope,	"	12	3	110	
25	Roaring Brook shaft,	Furnace,				6x4 6x4
26	Elk Hill,	"				6x4
27	Filer's shaft and slope,	Fan,	12	3	98	
28	Pierce,	"	16	4⅔	90	
29	Eaton,	"	12	3	100	
30	Jermyn No. 1, shaft,	Furnace,				6x6
31	Jermyn shaft,	"				6x6
32	Erie shaft,	Fan,	19¼	4½	60	
33	Belmont,	Furnaces,				6x6 6x6 6x6
34	Elk Creek,	Furnaces,				4x3
35	Forest City,	"				6x4
			22			19

PENNSYLVANIA

36	Slope No. 2,	Steam, &c.,	17½	5	65	
37	Shaft No. 6,	Fan and steam,	17½	5	65	
38	Shaft No. 5,	Fan,				

Continued.

COAL COMPANIES.

AMOUNT OF VENTILATION PER MINUTE.			How many splits of air?	Condition of ventilation.	Dimensions and area of intake—feet.	Dimensions and area of outcast feet.	NUMBER OF			Number.
At intake.	At face of workings	At outlet or upcast.					Shafts, depths of ft.	Slopes, length of—ft.	Tunnels—distance to coal.	
20,079	10,088	19,885	1	Fair,	105	49	30	175	1	1
11,863	8,700	12,400	2	Good,	120	40	130	80		2
20 000	17,500	18,250	2	"	120	60	110	330		3
16,000	17,500	19,500	2	"	63	64		1,399		4
45,750	32,850	47,140	2	"	100	100	236			5
							224			
2 880	750	4,280	1	Fair,	42	49		90		6
34.200	24.400	36 300	2	"		64	98	150	250′	7
36 600	29.600	36,800	2	Good,	80	60	185			8
							170			
				"			360			9
37.480		33,150	3	"	100	60	175			10
3,290	3 230	3,310	1	Fair,	42	36		1		11
				"	220	100	140			12
							170			
							147			
				"	60	66	165			13
51,300	42,280	52,260	4	"	50	64	155	1,200	3	14
					50	64				
					50	81				
					98	99				
36 590	21,300	38,240	2	"	280	132	190			15
37 670	33,720	41,200	2	"	81	64	112	545	1	16
29,810	23,720	30,120				48				
60,230	55,520	61,420	4	Good,	63	54	217	200		17
					63			250		
57, 120	37,691	57,448	2	"	80	64		1,025		18
33,700	34,300	35,080	4	"	115	133	300	200		19
								1,200		
125,000	129,123	143,800	8	"	300	250	355			20
							355			
51,000	49,150	51 600	3	"	220	133	287			21
							287			
33,000		33 280	2	"	70	50	300	345		22
92,625	89,879	98,045	5	"	554	150	160			23
							165			
62,290	32 410	63 180	4	"	84	63	90	380		24
33,460	31,780	35,920	2	"	210	140	290			25
							290			
8,250	2,640	8,800	1	Fair,	42	36	30			26
47.610	37,550	47,840	4	Good,	290	96	130	550		27
							110			
28,850	20 640	40,280	1	"	56	64	30	350	1	28
55,540	17,640	54 760	2	"	42	160	33	550	1	29
					63					
22,750	7 560	23,400	2	Fair,	42	64	90	250	1	30
					200					
Idle since last July,					70	64	140	250		31
89 740	39,090	90,530	3	Good,	280	133	177			32
							150			
25,200	16 300	26,400	3	Fair,	48	64	20		3	33
					58	64	15			
					68	64	22			
2 200	1,840	2 300	1	"	30	25	30		1	34
7,400	3,250	7,540	1	"	42	64	40		1	35
							43	20	14	

COAL COMPANY.

26,114	24 050	34 200	3	Good,	90	87		1,010		36
61,053	23,500	55,280	4	"	90	87	312			37
32,220	20,860	32,260	3	"	90	45	257			28

TABLE No. 5—

PENNSYLVANIA COAL

Number.	NAME OF COAL MINE OR COLLIERY.	Mode of Ventilation.	DIMENSIONS OF FAN. Diameter in feet.	Width of face in feet.	Revolutions of fan per minute.	Dimensions of furnace grate.
39	Shaft No. 11,	Fan,	17½	5	55	
40	Shaft No. 7,	"	17½	5	64	
41	Shaft No. 4,	"	17½	4½	62	
42	Slope No. 4,	Fan and natural,				
43	Tunnel No. 1,	Steam and natural,				
44	Slope No. 6,	Furnace,				30
45	Shaft No. 1,	Fan,	17½	5	60	
46	Shaft No. 8,	"	17½	5	48	
47	Shaft No. 9,	"	17½	5	62	
48	Shaft No. 10,	"	17½	5	68	
49	Barnum shaft,	Two fans,	17½	5	45	
50	Shaft No. 12,	Fan,	17½	5	45	
51	Shaft No. 13,	"	17½	5	49	
52	Law shaft,	"	17½	5	64	
53	Stark shaft,	Fan and steam,	17½			
54	Shaft No. 2, Dunmore,	Furnace,				4x6
55	Gypsy Grove,	Fan,	17½	5	70	
			15			2

DELAWARE, LACKAWANNA AND

56	Pyne shaft,	Fan,	12	4	125	
57	Taylor shaft and drift,	Two fans,	14	4	122	
58	Archbald shaft,	Fan,	12	3½	100	
59	Sloan shaft,	"	12	3½	120	
60	Continental shaft,	"	12	3½	128	
61	Hampton shaft,	"	12	3½	122	
62	Bellevue shaft and slope,	"	14	4	100	
63	Scranton Coal Company's slope,	"	12	3½	152	
64	Dodge shaft,	Two furnaces,				112
65	Central shaft,	Fan,	14	4	60	
			12	3½	125	
66	Hyde Park shaft,	Two furnaces,				96
67	Oxford shaft,		Sinking at present to G,			or Clark
68	Diamond shaft, No. 2,	Two fans,	14	4	95	
69	Diamond slope, No. 2,	Two furnaces,				96
70	Tripp's slope,	Fan,	14	4	95	
71	Brisbin shaft,	"	14	4	115	
72	Cayuga shaft,	"	12	3½	126	
			15			3

Continued.

COMPANY—Continued.

AMOUNT OF VENTILATION PER MINUTE.			How many splits of air?	Condition of ventilation.	Dimensions and area of intake—feet.	Dimensions and area of outcast—feet.	NUMBER OF			Number.
At intake.	At face of workings.	At outlet or upcast.					Shafts, depths of—ft.	Slopes, length of—ft.	Tunnels—distance to coal.	
47,850	38,200	51,410	4	Good, . . .	90	27 45	191	. . . . .	. . . .	39
40,400	33 930	40,400	4	" . .	90	100	312	. .	. . . .	40
22,800	21,320	23 570	2	" . .	90	47	232		. . . . .	41
17,075	16,160	21,946	3	" . .	48	120	. . .	1,000 184 650	. . . .	42
24,600	24,600	25,800	2	" . .	80	72	. . .	675	. . . .	43
12 470	11,900	12.790	2	" . .	90	25	97	. . . .	. .	44
12 570	11,352	13 000	2	" . .	120	70	430	. . . . .	. . . . .	45
26 500	25 120	27.000	3	" . .	90	70	206	. . . .	. . . .	46
59,100	50.000	68 400	3	"	156	60	140	.	. . . . .	47
105,000	86.200	112,700	6	" .	170	122	255	300	. . . .	48
119,845	112,460	122 000	5	" . .	240	180	173 202	. . . .	. . . .	49
18.200	17.000	20,000	2	" . .	115	78	135	. . . .	. . . . .	50
38 000	38,000	50 000	2	" . .	120	72	139	. . .	. . . .	51
44.900	30.360	57.500	2	" . .	120	62	206	. .	. . .	52
27.885	19,700	27,630	2	" .	90	72 42	113	. . .	. . . .	53
38,492	29,493	39.310	3	" . .	84	100	136½	1,850	1	54
65,335	62,457	67,400	8	" . .	125	120	100 167	.	. . . .	55
. . . . .	. . . .	. . . . .	. .	. . .	. .	. . .	19	7	1	

WESTERN RAILROAD COMPANY.

132.300	122.300	149.776	7	Good, . . .	234	100	319	772	. . .	56
143,660	133,112	164,295	6	" .	176 60	90 80	180	225 300	. . . .	57
65,596	60.888	79,386	3	" . .	302	100	354	563	. . . .	58
100,198	87,925	102.424	5	" . .	252	100	393	800	. . . .	59
62,500	60.515	68,950	5	" . . .	140	56	360	.	. . .	60
78,920	74,216	83.640	5	" . .	167	60	156	810	146′	61
124,940	109,709	162,491	7	" . .	215	200	221	265 700 662	. . . .	62
Idle in	1881,			" . . .	78	100	. .	1,102	. . .	63
118,533	100,005	151,008	6	" .	210	134	302		351′	64
93,546	77.216	102,902	6	" . .	100 128	100 90	320	900	. . .	65
58,162	48,429	74,561	4	" . . .	200	100	265	. . . .	255′	66
vein or	seam of	coal,	. . .	. . . .	. .	.	. .	. . .	. . . .	67
113,120	108,578	118 932	7	Good, .	280	170	167 223	148	. . . .	68
65.376	38,120	65,757	3	" . .	147	144	. .	375	90′	69
23.020	14.736	24,983	3	Fair, . .	55	170	. .	315	. . . .	70
121,135	112,299	132.060	6	Good, . .	140	90	378	. . . .	. . . .	71
71,735	61,120	77,715	3	" . .	140	72	368	. . .	. . . .	72
. . . . .	. . .	.	. . .	. . . . .	. . . . .	. . . .	14	14	4	

TABLE No. 5—

DELAWARE AND HUDSON

Number.	NAME OF COAL MINE OR COLLIERY.	Mode of Ventilation.	DIMENSIONS OF FAN.		Revolutions of fan per minute.	Dimensions of furnace grate.
			Diameter in feet.	Width of face in feet.		
73	Von Storch slope,	Fan,	20	5	80	.....
74	Legit's Creek shaft,	"	20	5	80	.....
75	Marvine shaft,	"	20	5	80	.....
76	Olyphant No. 2,	"	20	5	80	....
77	Grassy Island shaft,	Furnace,	....	.. ..	.....	8x8
78	White Oak,	"	.....	...	.....	8x8
79	No. 1 shaft, Carbondale,	Fan,	17	4	80	.....
80	No. 3 shaft, Carbondale,	"	17	4	100	16
81	Coal Brook,	"	17	4	100	.....
82	Racket Brook breaker,	.....	.. ..	.....	.....	.....
			7	.....	.....	2

Continued.

CANAL COMPANY.

AMOUNT OF VENTILATION PER MINUTE.			How many splits of air?	Condition of ventilation.	Dimensions and area of intake—feet.	Dimensions and area of outcast—feet.	NUMBER OF			Number.
At intake.	At face of workings.	At outlet or upcast.					Shafts, depths of—ft.	Slopes, length of—ft.	Tunnels—distance to coal.	
88,800	88,000	92,100	8	Good, . .	200	100	547 257	1,000 550	. . . .	73
94,560	81,640	102,935	6	" . .	140	100	324 320	250	. . .	74
98,000	97,360	104,000	5	" . .	140	100	340	.		75
194,630	84,800	120,000	5	" .	140	100	408 386	. . .	100′	76
47,700	35,800	55,000	3	Fair, . . .	140	70	300 240	500	.	77
25,540	12,100	35,000	1	" . .	60	81	81 25	1,200	150′	78
43,800	29,380	85,000	2	Good, . .	75	80	83 90	300	300′	79
. . . .	14,100	75,000	2	" . .	100	100	20 80	. . . .	. . . .	80
83,240	54,870	99,000	4	" . .	120	88	40	. . . .	800′ 300′ 250′	81
. . . . .	. . . . .	. . . . .	. . . .	. . . .	. . . . .	. . . . .	. . . . .	. . . . .	.	82
. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	16	6	6	

TABLE No. 5 –

MISCELLANEOUS

Number.	NAME OF COAL MINE OR COLLIERY.	Number of breakers.	Number of screens and chutes.	Number of persons employed in mines.	Number of persons employed outside.	Number of tons of coal mined.	Number of days worked in 1881.
1	Everhart colliery,	1	. .	74	49	56,861	254
2	Tompkins shaft,	1	. .	50	28	13,889	112½
3	Fairmount shaft,	1	. .	112	45	53,878	232
4	Seneca slope,	1	. .	111	69	54,270	219
5	Twin shaft,	1	. .	94	69	33,546	150
6	Beaver slope,	1	. .	27	5	16,029	230½
7	Butler shaft,	1	. .	90	67	63,326	243
8	Mo ier shaft,	1	. .	79	56	52,200	248
9	Heidleberg shaft,	1	. .	. .	. .	2,000	20
10	Phœnix shaft,	1	. .	95	59	36,112	151½
11	Columbia,	1	. .	28	19	15,605	141½
12	Hillside shaft,	1	. .	136	75	62,624	229½
13	Spring Brook,	1	. .	159	89	90,590	245½
14	Greenwood,	2	. .	243	166	149,013	226
15	Sibley shaft,	1	. .	122	82	76,871	185
16	National,	1	. .	236	96	124,004	226
17	Meadow Brook,	1	. .	211	121	116,431	223
18	School Fund,	1	. .	94	84	56,700	206
19	Mount Pleasant,	1	. .	164	117	123,716	256
20	Capouse shaft,	1	. .	395	111	276,840	243
21	Pi e Brook shaft,	1	. .	96	37	13,481	29
22	Fairlawn slope,	1	. .	82	75	53,056	228½
23	Jermyn's Green Ridge,	1	. .	237	95	181,514	214½
24	Green Ridge slope,	1	. .	198	102	126,831	250
25	Roaring Brook shaft,	1	. .	108	61	90,000	255½
26	Elk Hill,	1	. .	85	42	50,107	245
27	Filer's shaft and slope,	2	. .	274	139	132,720	221
28	Pierce,	1	. .	247	124	130,000	222
29	Eaton,	1	. .	197	79	108,193	258½
30	Jermyn, No. 1, shaft,	1	. .	195	104	118,481	235½
31	Jermyn slope,	1	. .	72	40	34,480	140
32	Erie shaft,	1	. .	171	68	79,411	204½
33	Belmont,	1	. .	35	20	4,856	60
34	Elk Creek,	1	. .	37	22	17,838	220
35	Forest City,	1	1	31	13	19,856	197½
		36	1	4,764	2,606	2,635,689	. . .

PENNSYLVANIA

36	Slope No. 2,	. . .	1	80	18	49,504	256
37	Shaft No. 6,	1	. . .	105	55	56,874	256
38	Shaft No. 5,	. . .	. . .	106	60	71,270	257
39	Shaft No. 11,	. . .	. . .	55	27	36,280	257
40	Shaft No. 7,	1	1	132	28	94,625	251
41	Shaft No. 4,	. . .	1	135	20	90,515	256
42	Slope No. 4,	. . .	1	114	27	71,962	258
43	Tunnel No. 1,	. . .	1	65	17	40,878	251
44	Slope No. 6,	. . .	. . .	47	18	27,826	256
45	Shaft No. 1,	. . .	. . .	46	20	29,477	256
46	Shaft No. 8,	1	1	102	43	60,686	256
47	Shaft No. 9,	. . .	. . .	94	45	69,323	256
48	Shaft No. 10,	1	. . .	215	96	126,130	256
49	Barnum shaft,	1	1	285	115	173,287	260
50	Shaft No. 12,	1	1	105	45	76,975	256
51	Shaft No. 13,	. . .	. . .	37	22	24,135	254
52	Law shaft,	. . .	. . .	104	44	68,801	256
53	Stark shaft,	1	. . .	106	62	73,263	262
54	Shaft No. 2, Dunmore,	1	1	99	12	53,407	254½
55	Gypsy Grove,	1	. . .	201	62	113,596	250½
		9	9	2,233	1,197	1,407,814	. . . .

Continued.

COAL COMPANIES.

Are you working towards where there is any standing water or gas?	Do you work airways with all gangways and headings?	Is there a careful watch kept over everything for safety of life and property.	Have you established a code of mine rules for the better protection of life and property.	Are you familiar with the mine laws of 1870, and its supplements.	Have you got a second opening.	How many kegs of powder used during the year 1881.	Number.
No,	Yes,	Yes,	No,	Yes,	Yes,	1,489	1
No,	Yes,	Yes,	No,	Yes,	Yes,	410	2
No,	Yes,	Yes,	No,	Yes,	Yes,	2,538	3
No,	Yes,	Yes,	No,	Yes,	Yes,	2,387	4
No,	Yes,	Yes,	No,	Yes,	Yes,	2,000	5
No,	Yes,	Yes,	No,	Yes,	Yes,	526	6
No,	Yes,	Yes,	No,	Yes,	Yes,	2,468	7
No,	Yes,	Yes,	No,	Yes,	Yes,	2,053	8
No,	Yes,	Yes,	No,	Yes,	Yes,		9
No,	Yes,	Yes,	No,	Yes,	Yes,	1,140	10
No,	Yes,	Yes,	No,	Yes,	Yes,	419½	11
No,	Yes,	Yes,	No,	Yes,	Yes,	2,427	12
No,	Yes,	Yes,	No,	Yes,	Yes,	2,700	13
No,	Yes,	Yes,	No,	Yes,	Yes,	7,235	14
No,	Yes,	Yes,	No,	Yes,	Yes,	3,331	15
No,	Yes,	Yes,	No,	Yes,	Yes,	4,770	16
No,	Yes,	Yes,	No,	Yes,	Yes,	4,626	17
No,	Yes,	Yes,	No,	Yes,	Yes,	1,825	18
No,	Yes,	Yes,	No,	Yes,	Yes,	3,942	19
No,	Yes,	Yes,	Yes,	Yes,	Yes,	8,923	20
No,	Yes,	Yes,	Yes,	Yes,	Yes,	503	21
No,	Yes,	Yes,	No,	Yes,	Yes,	1,846	22
No,	Yes,	Yes,	No,	Yes,	Yes,	5,411	23
No,	Yes,	Yes,	No,	Yes,	Yes,	5,440	24
No,	Yes,	Yes,	No,	Yes,	Yes,	4,249	25
No,	Yes,	Yes,	No,	Yes,	Yes,	1,710	26
No,	Yes,	Yes,	No,	Yes,	Yes,	4,635	27
No,	Yes,	Yes,	No,	Yes,	Yes,	4,190	28
No,	Yes,	Yes,	Yes,	Yes,	Yes,	3,196	29
No,	Yes,	Yes,	No,	Yes,	Yes,	2,966	30
No,	Yes,	Yes,	No,	Yes,	Yes,	918	31
No,	Yes,	Yes,	Yes,	Yes,	Yes,	2,625	32
No,	Yes,	Yes,	No,	Yes,	Yes,	175	33
No,	Yes,	Yes,	No,	Yes,	Yes,	604	34
No,	Yes,	Yes,	Yes,	Yes,	Yes,	596	35
						94,274	

COAL COMPANY.

No,	Yes,	Yes,	Yes,	Yes,	Yes,		36
No,	Yes,	Yes,	Yes,	Yes,	Yes,		37
No,	Yes,	Yes,	Yes,	Yes,	Yes,		38
No,	Yes,	Yes,	Yes,	Yes,	Yes,		39
No,	Yes,	Yes,	Yes,	Yes,	Yes,		40
No,	Yes,	Yes,	Yes,	Yes,	Yes,		41
No,	Yes,	Yes,	Yes,	Yes,	Yes,		42
No,	Yes,	Yes,	Yes,	Yes,	Yes,		43
No,	Yes,	Yes,	Yes,	Yes,	Yes,		44
No,	Yes,	Yes,	Yes,	Yes,	Yes,		45
No,	Yes,	Yes,	Yes,	Yes,	Yes,		46
No,	Yes,	Yes,	Yes,	Yes,	Yes,		47
No,	Yes,	Yes,	Yes,	Yes,	Yes,		48
No,	Yes,	Yes,	Yes,	Yes,	Yes,		49
No,	Yes,	Yes,	Yes,	Yes,	Yes,		50
No,	Yes,	Yes,	Yes,	Yes,	Yes,		51
No,	Yes,	Yes,	Yes,	Yes,	Yes,		52
No,	Yes,	Yes,	Yes,	Yes,	Yes,		53
No,	Yes,	Yes,	Yes,	Yes,	Yes,		54
No,	Yes,	Yes,	Yes,	Yes,	Yes,		55

TABLE No. 5—

DELAWARE, LACKAWANNA AND

Number.	NAME OF COAL MINE OR COLLIERY.	Number of breakers.	Number of screens and chutes.	Number of persons employed in mines.	Number of persons employed outside.	Number of tons of coal mined.	Number of days worked in 1881.
56	Pyne shaft,	1		222	116	167,667	219½
57	Taylor shaft and drift,	1		238	128	149,358	228½
58	Archibald shaft,	1		141	113	79,565	231½
59	Sloan shaft,	1		154	90	119,126	235½
60	Continental shaft,	1		151	99	48,243	161½
61	Hampton shaft,	1		255	142	190,471	239½
62	Bellevue shaft and slope,	1		245	180	165,486	235
63	Scranton Coal Company slope,	1		11	27		
64	Dodge shaft,	1		188	122	140,917	230½
65	Central shaft,	1		224	103	138,769	205½
66	Hyde Park shaft,	1		203	110	142,670	240½
67	Oxford shaft,	1		10	10		
68	Diamond shaft No. 2,	1		271	170	181,224	242½
69	Diamond slope No. 2,	1		127		81,401	244½
70	Tripp's slope,	1		123	106	69,017	244½
71	Brisbin shaft,	1		212	100	145,251	244½
72	Cayuga shaft,	1		202	90	107,014	210½
		16		2,993	1,793	1,926,177	

DELAWARE AND HUDSON

73	Von Storch slope,	1		413	144	237,756	226½
74	Legit's Creek slope,	1		247	114	137,289	211½
75	Marvin shaft,	1		242	85	165,628	231½
76	Olyphant No. 2,	1		175	112	105,239	232½
77	Grassy Island shaft,	1		240	118	142,282	231½
78	White Oak,	1		185	90	123,480	236½
79	No. 1 shaft, Carbondale,		1	252	31	25,923	231½
80	No. 3 shaft, Carbondale,		1	103	20	6,182	239
81	Coal Brook,	1		305	134	220,639	236½
82	Racket Brook breaker,	1			78	175,339	243½
		8	2	2,171	959	1,369,758	

RECAPIT

	Dimensions of fan—diameter in feet.	Dimensions of furnace grate.	NUMBER OF		
			Shafts, depths of—ft.	Slopes, length of—ft.	Tunnels—distance to
Miscellaneous coal companies,	22	19	43	20	14
Pennsylvania Coal Company,	15	2	19	7	1
Delaware, Lackawanna and Western Railroad Company,	15	3	14	14	4
Delaware and Hudson Canal Company,	7	2	16	6	6
Local coal sale mines,			2		11
	59	26	94	47	36

Add for home consumption, steam power and furnaces at mines, &c., and five per cent. of number of

Total tons of coal mined,

Continued.

WESTERN RAILROAD COMPANY.

Are you working towards where there is any standing water or gas?	Do you work airways with all gangways and headings?	Is there a careful watch kept over everything for safety of life and property.	Have you established a code of mine rules for the better protection of life and property.	Are you familiar with the mine laws of 1870, and its supplements.	Have you got a second opening.	How many kegs of powder used during the year 1881.	Number.
No,	Yes,	Yes,	Yes,	Yes,	Yes,		56
No,	Yes,	Yes,	Yes,	Yes,	Yes,		57
No,	Yes,	Yes,	Yes,	Yes,	Yes,		58
No,	Yes,	Yes,	Yes,	Yes,	Yes,		59
No,	Yes,	Yes,	Yes,	Yes,	Yes,		60
No,	Yes,	Yes,	Yes,	Yes,	Yes,		61
No,	Yes,	Yes,	Yes,	Yes,	Yes,		62
No,	Yes,	Yes,	Yes,	Yes,	Yes,		63
No,	Yes,	Yes,	Yes,	Yes,	Yes,		64
No,	Yes,	Yes,	Yes,	Yes,	Yes,		65
No,	Yes,	Yes,	Yes,	Yes,	Yes,		66
No,	Yes,	Yes,	Yes,	Yes,	Yes,		67
No,	Yes,	Yes,	Yes,	Yes,	Yes,		68
No,	Yes,	Yes,	Yes,	Yes,	Yes,		79
No,	Yes,	Yes,	Yes,	Yes,	Yes,		70
No,	Yes,	Yes,	Yes,	Yes,	Yes,		71
No,	Yes,	Yes,	Yes,	Yes,	Yes,		2

CANAL COMPANY.

No,	Yes,	Yes,	Yes,	Yes,	Yes,		73
No,	Yes,	Yes,	Yes,	Yes,	Yes,		74
No,	Yes,	Yes,	Yes,	Yes,	Yes,		75
No,	Yes,	Yes,	Yes,	Yes,	Yes,		76
No,	Yes	Yes,	Yes,	Yes,	Yes,		77
No,	Yes,	Yes,	Yes,	Yes,	Yes,		78
No,	Yes,	Yes,	Yes,	Yes,	Yes,		79
No,	Yes,	Yes,	Yes,	Yes,	Yes,		80
No,	Yes,	Yes,	Yes,	Yes,	Yes,		81
No,	Yes,	Yes,	Yes,	Yes,	Yes,		82

ULATION.

Number of breakers.	Number of screens and chutes.	Number of persons employed in mines.	Number of persons employed outside.	Number of tons of coal mined.	Number of days worked in 1881.	How many kegs of powder used during the year.
36	1	4,764	2,606	2,635,689		94,274
9	9	2,233	1,197	1,407,814	255 $\frac{57}{60}$	
16		2,993	1,793	1,926,177	221 $\frac{17}{60}$	
8	2	2,171	959	1,339,758	232	
1	3	110	14	35,000		
70	15	12,271	6,569	7,344,438		
tons of coal mined,				367,222		
				7,711,660		

TABLE No. 6.—*Machinery and steam power used at each colliery in the Eastern District of Luzerne and Carbon counties, now including all of Lackawanna and a portion of Wayne and Susquehanna counties, State of Pennsylvania, for the year ending December 31, 1881.*

MISCELLANEOUS COAL COMPANIES.

NAME OF COLLIERY.	Number of boilers in use.	Dimensions		Pressure per square inch.	Steam gauge or safety valve.	Date of last examination.	Condition when last examined.	Number of main rolls.	Number of pony rolls.	Number of main screens.	Number of pony screens.	Holsting engines.	
		Length, in feet.	Diameter, in inches.									Number.	Horse power.
Everhart colliery	5	30	34	60	Both,	New boilers,	Good,	2	2	1	1	2	30
Eagle shaft colliery	3	36	34	45	Both,	New boilers,	Good.						
Tompkins shaft colliery	6	30	30		Both,	December 20, 1881,	Safe,	2	2	1	1	1	45
Fairmount shaft colliery	4	22	34	70	Both,	October 23, 1881,	Good,	2	2	1	1	1	40
Seneca slope colliery	12	30	30	70	Both,	July 31, 1880,	Good,	2	2	1	1	1	60
Ravine shaft colliery	4	30	30	70	Both,	July 31, 1880,	Good,	2	2	2	2	1	60
Twin shaft colliery	9	30	30	70	Both,	July 31, 1880,	Good,	2	2	1	1	1	60
Beaver slope colliery	2	34	30	40	Both,	July 2, 1881,	Good,			1		1	20
Butler shaft colliery	3	39	30	55	Both,	September 20, 1879,	Good,	2	4	2	6	1	40
	4	29	30										
	2	25	30										
Mosier shaft colliery	6	35	30	60	Both,	New boilers,	Good,	2	2	2	2	1	60
Heidelberg shaft colliery	9	36	30	75	Both,	New boilers,	Good,					3	475
Ontario breaker colliery	6	36	30	60	Both,			2	2	2	2	1	30
Phœnix shaft colliery	6	36	34		Both,	December 17, 1880,	Good,	2	2	1	2	1	60
Columbia colliery	2	31	30		Both,	December 1, 1879,	Good,			1			
Hillside shaft colliery	10	30	30		Both,	December 15, 1880,	Good,	2	2	6	2	2	80
Spring Brook colliery	8	30	30		Both,	December 15, 1880,	Good,	2	2	3	1	4	167
	2	36	34										
Stetler shaft colliery	6	34	40	75	Both,	December 24, 1881,	Good,	2	2	2	5	2	200
Greenwood slope colliery	10	30	30	80	Both,	December 20, 1881,	Good,	2	4	8	3	2	90
Coray breaker	3	30	30		Both,			2	2	4	3		
Shaft No. 1	2	30	30	60	Both,	December 23, 1881,	Good.						
Sibley shaft colliery	8	30	30	70	Both,	December 24, 1881,	Good,	4	4	4	2	2	90
National colliery	4	34	32	70	Both,	August 6, 1881,	Good,	2	2	4	2	1	52
Meadow Brook colliery	6	32	32	70	Both,	August 6, 1881,	Good,					1	100
Meadow Brook breaker	3	34	34	50	Both,	August 6, 1881,	Good,	2		4	2		
School Fund slope colliery	5	30	30	75	Both,	September 17, 1881,	Good,	2	2	3	1	3	160
	3	30	34										
	2	32	34										

Mount Pleasant slope colliery,	2	30	30	75	Both,	March 1, 1880,	Good,	2	2	6	2	2	100	
	6	35	30											
Mount Pleasant air shaft,	2	30	30	80	Both,	March 1, 1880,	Good.							
	2	15	40											
Capouse shaft colliery,	15	30	36	70	Both,	October 1, 1881,	Good,	2	2	6	2	4	272	
Pine Brook shaft colliery,	3	24	36	70	Both,	October 1, 1881,	Good,			2		2	60	
	6	30	36											
Fair Lawn slope colliery,	4	30	30	70	Both,	July 2, 1881,	Good,	2	2	1	2	2	65	
Jermyn Green Ridge shaft colliery,	21	36	34	85	Both,	December 1, 1881,	Good,	2	2	2	4	4	200	
Green Ridge slope colliery,	9	40	34	75	Both,	December 11 and 18, 1881,	Good,	2	2	3	1	5	255	
Roaring Brook shaft colliery,	6	36	35	70	Both,	August 20, 1881,	Good,	2		2		5	75	
	7	23	30											
Lucas shaft colliery,	6	34	40		Both,	New boilers,	Good,					2	60	
Elk Hill colliery,	2	50	30	50	Both,	August 11, 1879,	Good,	2	2	2	2			
Pancost Coal Company colliery,	5	34	40	70	Both,	New boilers,	Good,	1	1	3	3	1	30	
Throop shaft,	18	34	36	70	Both,	New boilers,	Good,					5	530	
Lackawanna Coal Company colliery,						New boilers,	Good, sinking shaft,					4	500	
Filer shaft colliery,	6	30	30	65	Both,	July 4, 1881,	Good,	2	2	2	4	2	200	
Filer's slope colliery,	6	30	30	65	Both,	July 4, 1881,	Good,	2	2	2	4	2	60	
Pierce Coal Company colliery,	3	36	34	80	Both,	December 28, 1880,	Good,	2	2	2				
	1	18	48	50	Both,									
Eaton colliery,	3	40	34	60	Both,	November 19, 1881,	Good,	2		2	2	3	90	
	3	36	34											
Jermyn's No. 1 shaft colliery,	9	36	34	75	Both,	November 19, 1881,	Good,	2		2		2	120	
Jermyn's slope colliery,	4	36	34	60				2		2		2	50	
Erie shaft colliery,	12	30	34	95	Both,	July 10, 1881,	Good,	2	2	4	1	2	60	
Belmont colliery,	3	32	30	60	Both,	New boilers,	Good,	1	1	1	2			
Elk Creek colliery,	3	30	24	60	Both,	March 13, 1880,	Good,	1	1	1	1			
	323													

PENNSYLVANIA COAL COMPANY.

Slope No. 2, (Port Griffith,)	6	46	30	75	Both,	September 14 and 16, 1881,	Good,					1	40	
Shaft No. 6,	9	36	30	75	Both,	September, 12, 1881,	Good,	2		4	0	1	40	
Shaft No. 5,	3	36	30	75	Both,	September 12, 1881,	Good,					1	40	
Shaft No. 11,	3	36	30	75	Both,	September 13 and 15, 1881,	Good,					1	40	
Shaft No. 7,	5	36	30	75	Both,	September 18, 1881,	Good,					1	40	
Shaft No. 4,	7	36	30	75	Both,	September 13 and 15, 1881,	Good,					1	40	
Slope No. 4,	5	36	30	75	Both,	September 12, 1881,	Good,					3	60	
Tunnel No. 1,	3	36	30	75	Both,	September 12, 1881,	Good,					2	40	
Slope No. 6,					Both,							1	25	
Shaft No 1,	5	36	30	75	Both,	September, 12, 1881,	Good,					2	60	
Shaft No. 8,	5	36	34	75	Both,	September 12, 1881,	Good,	2		4		1	40	
Shaft No. 9,	3	36	30	75	Both,	September 12, 1881,	Good,					1	40	
Shaft No. 10,	6	36	30	75	Both,	September 12, 1881,	Good,	2		8		4	100	
Barnum shaft Nos. 1 and 2,	16	36	30	75	Both,	September 18, 1881,	Good,	2	4	4	17	3	120	
Shaft No. 12,	6	36	30	75	Both,	September 18, 1881,	Good,					1	40	
Shaft No. 13,	5	36	30	75	Both,	September 18, 1881,	Good,					1	40	
Law shaft,	11	36	30	75	Both,	September 14 and 16, 1881,	Good,					2	40	
Stark's shaft,	5	36	30	75	Both,	September 18, 1881,	Good,	2		4		1	40	

TABLE No. 6—Pennsylvania Coal Company—Continued.

Name of Colliery.	Number of boilers in use.	Dimensions		Pressure per square inch.	Steam gauge or safety valve.	Date of last examination.	Condition when last examined.	Number of main rolls.	Number of pony rolls.	Number of main screens.	Number of pony screens.	Hoisting engines.	
		Length, in feet.	Diameter, in inches.									Number.	Horse power.
Central breaker,	3	36	30	75	Both,	September 13, 1881,	Good,	2			4		
No. 2 breaker, Pittston,	5	36	30	80	Both,	November 13, 1881,	Good,	2	2	2	8		
No. 6 breaker, Dunmore,	3	36	30	80	Both,	September 12, 1881,	Good,	2	2	2	4		
Screens, Dunmore,	3	36	30	80	Both,	November, 6, 1881,	Good,		4	2	5	1	53
No. 3 shaft, Pittston,	3	36	30	75	Both,	September 14, 1881,	Good,						
No. 2 shaft, Dunmore,	3	36	30	80	Both,	November 6, 1881,	Good,					1	90
No. 3 shaft, Gypsy Grove,	7	36	30	80	Both,	October 27, 1881,	Good,	2		2	4	1	70
No. 4 shaft, Gypsy Grove,	3	36	30	80	Both,	November 20, 1881,	Good,					1	70
	133												

DELAWARE, LACKAWANNA AND WESTERN RAILROAD COMPANY.

Pyne shaft,	12	30	34	80	Both,	December 18, 1881,	Good,	4	2	4	2	2	300
Taylor shaft and drift,	12	30	34	75	Both.	September 5 and 12, 1881,	Good,	2	2	3	2	3	160
	4	40	34										
Archibald shaft,	4	36	34	85	Both,	August 1, 1881,	Good,	3	2	2	2	2	90
	6	30	34										
Sloan shaft,	12	30	34	85	Both,	September 6 and 21, 1881,	Good,	2	2	4	6	2	120
Continental shaft,	9	40	34	75	Both,	October 18, 1881,	Good,	2	2	2	2	2	90
Hampton shaft,	13	36	34	70	Both,	October 20, 1881,	Good,	3	2	4	3	2	80
Bellevue shaft and slope,	9	36	34	80	Both,	November 12 and 19, 1881,	Good,	4	2	2	2	6	370
	12	38	34										
Scranton Coal Company's slope,	8	32	34	75	Both,	September 2 and 4, 1881,	Good,	2	2	2	2	2	120
	4	30	34										
Dodge shaft,	12	36	34	80	Both,	December 1 and 4, 1881,	Good,	2	2	2	1	2	90
Central shaft,	12	30	34	85	Both,	December 1, 1881,	Good,	2	2	2	2	4	180
	4	40	34										
Hyde Park shaft,	6	36	34	75	Both,	July 10, 1881,	Good,	3	2	4	2	2	90
	3	40	34										
Oxford shaft,	9	40	34	75	Both,	July 15, 1881,	Good,	2	2	2	2	2	90

Diamond shaft No. 2,	10	40	34	75	Both,	September 24, 1881,	Good,						2	80
Diamond breaker No. 2,	4	26	34	80	Both,	November 12, 1881,	Good,	2	2	2	2		2	80
Diamond air-shaft,	9	30	34	80	Both,	November 13 and 20, 1881,	Good,							
Diamond slope, No. 2,	6	38	34	80	Both,	November 8, 1881,	Good,						1	50
	4	36	34											
Tripp's slope,	4	30	34	65	Both,	December 13, 1881,	Good,	2	4	2	2		2	60
	3	40	34											
Brisbin shaft,	12	30	34	80	Both,	November 9, 1881,	Good,	4	2	2	2		2	120
Cayuga shaft,	12	30	34	80	Both,	November 12, 1881,	Good,	2	2	2	2		2	120
Storr's shaft,	6	40	34	85	Both,	August 8, 1881,	Good,						1	40
Oxford air-shaft,	6	36	34	75	Both,	November, 1881,	Good,						2	90
	227													

DELAWARE AND HUDSON CANAL COMPANY.

Von Storch slope,	26	36	34	80	Both,	October 9, 1881,	Good,	1	2	8	4		5	296
Legitt's Creek shaft,	14	30	34	80	Both,	October 23, 1881,	Good,	1	1	3	2		3	200
Marvin shaft,	12	36	34	80	Both,	October 23, 1881,	Good,	1	1	4	2		2	123
Olyphant, No. 2,	15	36	34	80	Both,	November 20, 1881,	Good,	1		2	2		5	271
Grassey Island,	12	36	34	80	Both,	November 20, 1881,	Good,	1	1	4	2		2	72
White Oak,	9	35	34	60	Both,	November 15, 1881,	Good,	1	2	2	4			
No. 1 shaft, Carbondale,	7	30	30	60	Both,	November 12, 1881,	Good,							
		35	34											
No. 3 shaft, Carbondale,	9	35	34	60	Both,	November 19, 1881,	Good,						2	117
Coal Brook, Carbondale,	7	35	34	60	Both,	November 5, 1881,	Good,	1	2	6	8		1	56
Racket Brook, Carbondale,	5	35	34	75	Both,	November 5, 1881,	Good,	1	1	4	2			
	116													

TABLE No. 6—Continued.

MISCELLANEOUS COAL COMPANIES.

Name of Colliery.	Breaker Engines.		Fan Engines.		Pumping Engines.		Donkey-Pump Engines.		Hoisting Engines in Mines.		Total number of engineers.	Total horse-power.	Remarks.
	Number.	Horse-power.	Number.	Horse-power.	Number.	Horse-power.	Number.	Horse-power.	Number.	Horse-power.			
Everhart colliery,	1	60			1	40	2	25			6	155	
Eagle shaft colliery,													Not working in 1881.
Tompkin's shaft colliery,	1	30	1	8	1	40	1	15			5	138	
Fairmount shaft colliery,	1	16	1	10					1	6	4	72	
Seneca slope colliery,	1	40	1	20	1	60	2	20	1	30	7	230	Examined, but not reported.
Ravine shaft colliery,	1	40			1	70					3	170	
Twin shaft colliery,	1	40	1	20			3	70			6	90	
Beaver slope colliery,											1	20	
Butler shaft colliery,	1	40					2	50	1	25	5	155	Examined January, 1882.
Mosier shaft colliery,	1	40	1	25	1	40					4	165	Examined February, 1882.
Heidelberg shaft colliery,			1	60							4	535	
Ontario breaker colliery,	1	30									2	60	Cleaned, but not reported.
Phœnix shaft colliery,	1	40	1	25	2	80					5	205	do. do.
Columbia colliery,	1	50									1	50	do. do.
Hillside shaft colliery,	2	85					3	35	2	35	9	235	Examined and reported in good condition, January, 1882.
Spring Brook colliery,	1	25	1	10			4	50			10	252	
Stetler shaft colliery,	1	80	1	40							4	320	
Greenwood slope colliery,	1	60			6	100					9	250	
Coray breaker,	1	60									1	60	Idle in 1881.
Shaft No. 1,													Sinking.
Sibley shaft colliery,	1	45	2	40			5	165			10	340	
National colliery,	1	40									2	92	
Meadow Brook colliery,			1	26			2	60	1	52	5	238	
Meadow Brook breaker,	1	45									1	45	
School Fund slope colliery,	1	35	2	30			4	40	1	10	11	175	
Mount Pleasant slope colliery,	1	40					4	100			7	240	Cleaned, but not reported.
Mount Pleasant air shaft,			1	20							1	20	
Capouse shaft colliery,	1	40	2	70	1	60	2	35			10	477	
Pine Brook shaft colliery,	1	60			1	60	1	20			5	200	
Fair Lawn slope colliery,	1	35	1	45			1	8			5	153	
Jermyn Glen Ridge shaft colliery,	1	60	2	115			4	64	1	25	12	464	

Green Ridge slope colliery,	1	60	1	25	2	60	1	20	. .	. . .	10	420		
Roaring Brook shaft colliery,	1	40	. . .	. .	1	90	. . .	. . .	. . .	. . .	7	205		
Lucas shaft colliery,	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	2	60		
Elk Hill colliery,	1	40	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	1	40	Cleaned, not reported.	
Pancost Coal Company colliery,	1	40	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	2	70	Machinery new.	
Throop shaft,	. . .	.	1	100	. .	. . .	1	25	. . .	. . .	7	655	do.	
Lackawanna Coal Company colliery,	1	100	1	100	. . .	. . .	. . .	. . .	. . .	. . .	6	700	do.	
Filer's shaft colliery,	1	50	1	50	. . .	. . .	4	60	. .	. . .	8	360		
Filer's slope colliery,	1	50	. . .	. .	. . .	. . .	. . .	. .	. . .	. . .	3	110		
Pierce Coal Company colliery,	1	40	1	20	. .	. . .	. .	. .	. . .	. . .	2	60	Cleaned, not reported.	
Eaton colliery,	1	25	2	40	. .	. . .	. .	. .	. . .	. . .	6	155		
Permyn's No. 1 shaft colliery,	1	30	.	.	. . .	. . .	. . .	. .	.	3 45	6	195		
Jermyn's slope colliery,	1	25	. . .	.	. . .	. . .	. . .	. .	. . .	. . .	3	75	Idle since July, 1881.	
Erie shaft colliery,	1	30	1	35	1	60	3	45	2	40	10	270		
Belmont colliery,	1	60	. . .	. .	. . .	. . .	. . .	. .	. . .	. . .	1	60		
Elk Creek colliery,	1	30	. .	. .	. . .	. . .	. . .	. .	. . .	. . .	1	30	Examined January 16, 1882.	
											230	9,176		

PENNSYLVANIA COAL COMPANY.

Slope No. 2, (Port Griffith,)	. . .	. . .	. . .	. . .	. . .	. . .	2	130	4	55	7	225		
Shaft No. 6,	1	25	. . .	. . .	1	50	. . .	. .	. . .	. . .	3	115		
Shaft No. 5,	. . .	. . .	1	20	. . .	. .	1	10	. . .	. . .	3	70		
Shaft No. 11,	. . .	. . .	1	30	. . .	. .	1	10	. . .	. . .	3	80		
Shaft No. 7,	. . .	. . .	. . .	.	1	120	1	20	2	40	5	220		
Shaft No. 4,	. . .	. . .	1	20	2	60	1	10	2	40	7	170		
Slope No. 4,	. . .	. . .	. . .	. . .	. . .	. . .	2	35	. . .	. . .	5	95		
Tunnel No. 1,	. . .	. . .	. . .	. . .	. . .	. . .	1	20	. . .	. . .	3	60		
Slope No. 6,	. .	. . .	. . .	. . .	. . .	. . .	. .	. .	. .	. . .	1	25		
Shaft No. 1,	. . .	. . .	1	20	. . .	. . .	. . .	. . .	. . .	. . .	3	80		
Shaft No. 8,	1	25	. .	. .	. . .	. . .	. . .	. . .	. . .	. . .	2	65		
Shaft No. 9,	. . .	. . .	1	20	1	50	. . .	. .	. . .	. . .	3	110		
Shaft No. 10,	. . .	. . .	.	. . .	1	30	1	10	1	25	7	165		
Barnum shaft, Nos. 1 and 2,	1	50	2	60	1	40	2	25	4	50	13	345		
Shaft No. 12,	. . .	. . .	1	20	. . .	. . .	1	10	. .	. . .	3	70		
Shaft No. 13,	. . .	. . .	1	20	2	80	3	35	. . .	. . .	7	175		
Law shaft,	. .	. . .	1	20	1	40	3	120	. . .	. . .	7	220		
Stark's shaft,	1	25	1	20	. . .	. . .	. . .	. . .	4	60	7	145		
Central breaker,	1	40	. .	. .	. .	. . .	. . .	. . .	. . .	. . .	1	40		
No. 2 breaker, Pittston,	1	125	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	1	125		
No. 6 breaker, Dunmore,	1	30	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	1	30		
Screens, Dunmore,	1	50	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	2	103		
No. 3 shaft, Pittston,	. . .	. . .	. . .	. . .	1	50	. . .	. . .	. . .	. . .	1	50		
No. 2 shaft, Dunmore,	. .	. . .	. . .	. . .	. . .	. . .	2	18	2	98	5	206		
No. 3 shaft, Gypsy Grove,	1	70	. . .	. . .	2	160	1	9	. . .	. . .	5	309		
No. 4 shaft, Gypsy Grove,	. . .	. .	1	35	. .	. .	. . .	. . .	. . .	. . .	2	105		
											107	3,403		

TABLE No. 6—Continued.

DELAWARE, LACKAWANNA AND WESTERN RAILROAD COMPANY.

Name of Colliery.	Breaker Engines.		Fan Engines.		Pumping Engines.		Donkey-Pump Engines.		Hoisting Engines in Mines.		Total number of engines.	Total horse-power.	Remarks.
	Number.	Horse-power.	Number.	Horse-power.	Number.	Horse-power.	Number.	Horse-power.	Number.	Horse-power.			
Pyne shaft,	1	60	1	40	1	150	1	10	1	15	7	575	
Taylor shaft and drift,	1	60	1	40	1	90	2	35	1	30	9	415	
Archbald shaft,	1	60	1	40	. . .	. . .	3	150	. . .	. . .	7	340	
Sloan shaft,	1	60	1	40	. . .	. . .	3	66	. . .	. . .	7	286	
Continental shaft,	1	60	1	40	1	90	4	100	. . .	. . .	9	380	
Hampton shaft,	1	60	1	40	1	90	1	40	1	30	7	340	
Bellevue shaft and slope,	1	60	1	60	1	90	7	97	1	50	17	677	
Scranton Coal Company's slope,	1	60	1	40	. . .	. . .	2	37	. . .	. . .	6	257	
Dodge shaft,	1	60	. . .	. . .	1	90	. . .	. . .	. . .	. . .	4	240	
Central shaft,	1	60	1	40	2	300	5	100	1	30	14	710	
Hyde Park shaft,	1	60	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	3	150	
Oxford shaft,	1	60	. . .	. . .	1	90	2	40	. . .	. . .	6	280	
Diamond shaft No. 2,	. . .	. . .	1	40	1	90	3	140	2	60	10	410	
Diamond breaker No. 2,	1	60	. . .	. . .	. . .	. . .	2	40	. . .	. . .	5	180	
Diamond air-shaft,	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	
Diamond slope No. 2,	. . .	. . .	. . .	. . .	. . .	. . .	4	190	1	30	6	270	
Tripp's slope,	1	60	. . .	. . .	. . .	. . .	3	103	. . .	. . .	6	223	
Brisbin shaft,	1	60	1	40	. . .	. . .	2	120	. . .	. . .	6	340	
Cayuga shaft,	1	60	1	40	2	240	1	20	. . .	. . .	7	480	
Storr's shaft,	. . .	. . .	. . .	. . .	. . .	. . .	1	25	. . .	. . .	2	65	
Oxford air-shaft,	. . .	. . .	1	40	. . .	. . .	4	90	. . .	. . .	7	220	
											145	6,838	

DELAWARE AND HUDSON CANAL COMPANY.

Von Storch slope,	1	61	1	72	. . .	. . .	3	152	2	10	12	591	
Legitt's Creek shaft,	1	61	1	49	1	77	3	32	2	10	11	429	
Marvin shaft,	1	61	1	49	1	120	2	20	. . .	. . .	7	373	

Olyphant, No. 2,	1	36	2	117	1	77	3	122	. . .	. . .	12	623
Grassey Island,	1	61	. . .	. . .	1	77	6	167	2	10	12	387
White Oak,	1	61	. . .	. . .	. . .	. . .	. . .	. .	. . .	. . .	1	61
No. 1 shaft, Carbondale,	.	. .	1	36	1	61	1	40	. . .	. . .	3	137
No. 3 shaft, Carbondale,	. . .	. .	1	36	2	100	1	10	. . .	. . .	6	263
Coal Brook, Carbondale,	1	77	1	36	. . .	. . .	3	30	. .	. . .	6	199
Racket Brook, Carbondale,	1	77	. . .	. . .	. . .	. . .	. . .	. . .	.	. . .	1	77
											71	3,140

RECAPITULATION.

Name of Colliery.	Number boilers in use.	Number of engines.	Total horse-power.
Miscellaneous coal companies,	323	230	9,176
Pennsylvania Coal Company,	133	107	3,403
Delaware, Lackawanna and Western Railroad Company,	227	145	6,838
Delaware and Hudson Canal Company,	116	71	3,140
	799	553	22,575

No. 9.

Section of

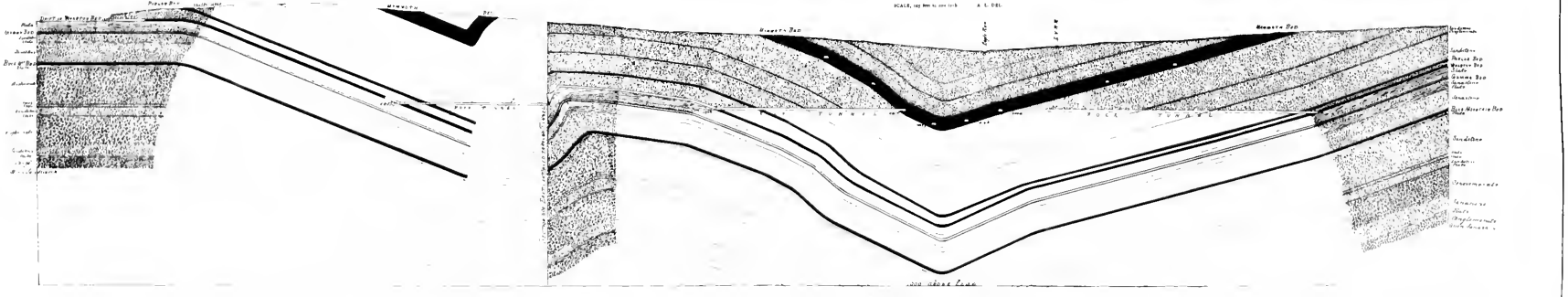
Cranberry Colliery,

through North Rock Tunnel

From

Mammoth to Wharton Beds,

Looking East.



No. 9.

Section of

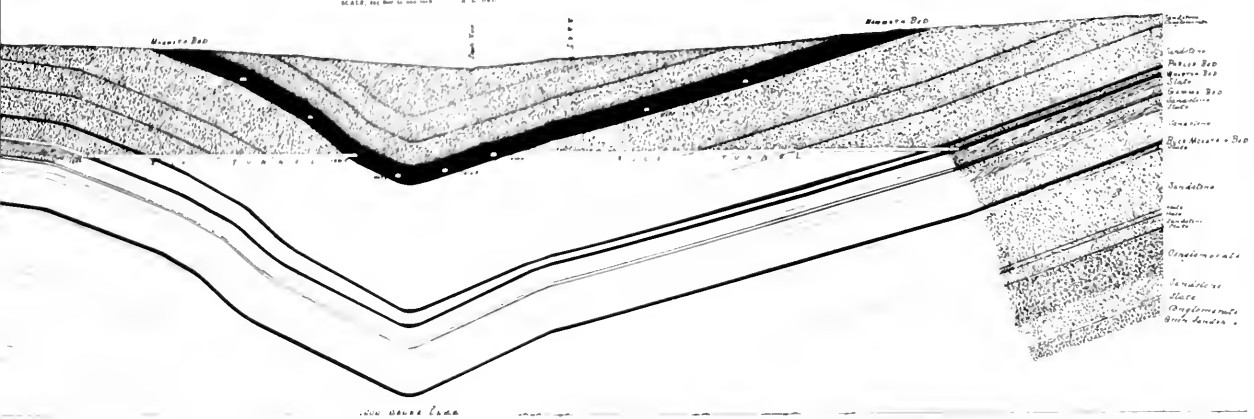
Cranberry Colliery,

through North Rock Tunnel

From

Mammoth to Wharton Beds,

Looking East



LUZERNE AND CARBON COUNTIES.

SOUTH DISTRICT.

To His Excellency Henry M. Hoyt,

Governor of the Commonwealth of Pennsylvania:

Sir: I had the honor of receiving my commission as inspector of coal mines for the south district of Luzerne and Carbon counties on the 17th day of July, 1881, and entered upon the duties of said office on the 19th day of the same month; hence my service covers a little over five months of that year. In compliance with an act of Assembly, entitled "An act providing for the health and safety of persons employed in and around coal mines," approved March 3, 1870, I have the pleasure of presenting my (first) annual report. I regret the large increase in loss of lives over the previous year. The number of deaths from accidents was forty-seven, the number of non-fatal accidents was eighty-eight. The total production of coal was 5,037,948 tons, which is the largest production on record for this district, an increase of 739,184 tons over last year. But even that does not make up for the enormous increase in fatal accidents; for that some other reason exists. By comparing the statistics of this district for the last six years we find a great variation in the ratio of coal mined per life lost. The ratio of 1876, 1877, 1878, 1879, 1880 were respectively 94,679, 156,539, 98,553, 166,626, 165,337 tons, and the ratio for 1881 was 107,190 tons. I cannot explain satisfactorily these great fluctuations in the ratio of coal mined per life lost; therefore will not make the attempt.

Of these deaths, twenty-four were caused by falls of coal, slate, and roof; mine cars added eleven to the number, and explosion of fire damp added three more to the number of deaths. The two first items cover 74.46 per cent. of the total number. The other accidents were from miscellaneous causes in and about the mines. If the parties interested had lived up to the full requirements of the law, I doubt not that many of these accidents would have been avoided.

To afford some explanation of the accidents, fatal and non-fatal, tables Nos. 1 and 2 were prepared. Other tables have been prepared which, I hope, will prove interesting and of value. These tables cover the whole

year; but the detailed statements of fatal accidents only cover my term of office. I have made no special mention of fans in this report, as no experiments were made on any of them, my time being taken up with other matters which I deemed of more importance. Have given my views in detail on the duties of superintendents, mine bosses, and miners; also, on the importance of leveling in coal mines on boundary pillars, and on the necessity of having pillars left between all coal mines. The mode of working and the system of ventilation have been fully explained by my predecessor, and I have therefore dealt but little with the same.

The general condition of collieries, so far as ventilation is concerned, is fair. A large amount of work has been accomplished, tending to the improvement of air-ways in the different collieries, and I hope to be able to report a number of new fans the coming year, which will make up the deficiency in some of the mines. The result of my investigation of the various collieries and the various accidents, is fully explained. Accompanying this report will be found a plan of the new hospital erected at Drifton, by Coxe Bros. & Co., cross sections of the Cranberry mines, operated by A. Pardee & Co., showing the different seams of coal, the different tunnels and slopes; also, a small sketch, showing that portion of No. 9, Lehigh Coal and Navigation Company, where the fire occurred on the 29th day of July, 1881; showing the tunnels, inside slope, where the fire ignited, and its location at present.

Trusting that in future reports I may be able to do fuller justice to the subjects that I am called to deal with,

I am yours, very respectfully,

JAMES E. RODERICK,
Inspector of Coal Mines.

HAZLETON, *March 1, 1882.*

General Condition of Collieries.

On the 19th day of July I entered on active duty as Inspector of Mines for the South district of Luzerne and Carbon counties. In my travels through the different collieries, all the officials treated me with courtesy. But for a few of these gentlemen, my visits were a little premature, as in another month things would be different, as they had intended to enlarge some air-ways and cross-cuts, and put in a few more doors, &c. But I am confident had I visited them a month sooner, that things would have been a little different. Coming into a district that was comparatively strange to me, (though their mode of working was not,) one thing struck me very forcibly, *i. e.*, that a large number of mine officials are still adhering to the old way of conducting air to faces of gangways, viz: by an air-way made of planks or boards. This is a poor substitute for an air-way. When first made, it looks as if the air could be conducted successfully through

it, but under the most favorable circumstances, I never saw such an air-way that was able to confine and conduct half the amount of air that entered it into the face of a gangway fifteen hundred feet long. The reasons for its inefficiency are many. First, the irregularity of the strata, making it impossible to stop the leakages, as men cannot fashion boards and planks to fit perfectly against the roof. The blasting through the mines continually shakes this frail structure, while the opening of breasts and the blasting in face of gangway, which are near by, do greater damage to it. Add to this the cars that accidentally get off the track and break it, sills and rails thrown against it, &c., and this mode of conducting air becomes a very expensive luxury to mine owners, and a great source of danger to the life and limb of miners. To force a small steady current of air to the face of a gangway, there must be a party of men continually repairing, filling the cracks with mortar, hay, clay, &c., and after all the trouble and expense, they have not a sufficient quantity of air.

As the mines cannot be worked without a certain quantity of air, the companies have often to spend double the amount of money that would be necessary if the right kind of air-way had been made at the outset. For successful ventilation, the air-ways should be driven in the coal, and large enough to permit the air to travel with as little friction as possible. The text-books will give the desired information on that subject. The air-ways in mines that do not generate explosive gases should have an area of from thirty to forty feet. Circumstances are not the same in all the collieries, hence air-ways should be made according to the necessity of the place. In fiery mines, necessity is the best teacher in regulating size of air-ways, cross-cuts, the mode of conducting the air to the face of the workings, the number of doors needed, etc.

The cross-cuts between gangways and air-ways should be built with stone and mortar. In gas-generating mines all the cross-cuts should be built that way, then the official in charge can expect to find nearly as much air near the face of gangway as goes in the mouth of air-way. I have seen many mine bosses very well satisfied when able to show a reasonable current near face of gangway, without thinking that the air on gangway was of very little service to miners in breasts extending from ten to fifty yards off the main road. Have seen a number of gangways without a single door on them, and the miners at face of breasts working in smoke, rendering them unable to distinguish between slate and coal, except by their respective weights. In all such places I have ordered doors to be put in, which has been invariably done, and in all cases mine officials were well satisfied with the general result. Only one objection was made, *i. e.*, that every new door meant an additional boy to attend it, which would add a few cents to the general expenses of the colliery per day.

In other collieries, when the air-ways are driven in the solid coal, they are driven so small that it is impossible, with their present power, to force enough air into said mines. All air-ways in mines in this district, that do

not generate explosive gases, are expected to have a sectional area of twenty-five feet,* but I must say that I have measured a large number of them, and in different places, and found them varying in area from fifteen to twenty feet, an odd one having the required area, which, as I said before, I consider too small for successful ventilation. I attribute this to the carelessness of mine bosses, in allowing the men to drive such small holes. They are paid for driving them the regular size, and it is much easier to drive them that size than smaller, and under no circumstances should a mine boss permit them to be below the standard size. These "rat holes" are evidences of the ignorance of mine boss and miner. In other places I have found cross-cuts between breasts entirely too small. Even if they had large air-ways and doors on gangways, these small cross-cuts would make it impossible to ventilate successfully.

To show the effect of this, I will cite one instance. I went to a certain colliery and traveled right on to the face of the gangway, intending to return through the breasts, as this was my first visit to the place. In the cross-cut between the air-way and gangway, near the face, I measured the air, and found only two thousand six hundred cubic feet of air per minute passing, which was little more than half the air that had been reported. I told the mine boss that he had not reported the right amount of air. The man was confused, but insisted that his reports were correct, and that he had measured the air a couple of days previous, and found over five thousand cubic feet of air per minute passing. Then he went around to try to find out the reason for such a decrease, but could find nothing. I asked him if he had made any changes within a few days, such as putting in check or gangway doors. He answered that he had put in one door on the gangway, which was close by, to turn the air into the face of a breast that was being turned. I asked him the size of cross-cut between the breasts in that pillar. He answered that it was the usual size, but could not give the area of it. Then I told him to open the door, and as soon as it was opened the air commenced to travel faster, and the anemometer showed a little over five thousand cubic feet of air per minute passing. Then we went into the breast and found that the cross-cut had an area of only fourteen feet. The mine boss saw at once where the trouble was, and had the cross-cut enlarged to the proper size; since then he has been able to get the required amount of air at the face. This boss is a good practical man, but never thought such small holes would have so great an effect on ventilation.

In other places in this district I have found the air-ways and cross-cuts large, and doors and check-doors in their proper places—everything, from top to bottom, showing that the men in charge had a clear conception of their duties, and that they were endeavoring to carry out the spirit of the ventilation law—doing everything intelligently, and undoubtedly with profit to their employers, and greatly benefiting the health and comfort of employés under their charge. Employers can hardly set a value on the services

* Since the ventilation law came in force, this is the standard size in this district.

of such men, and I am happy to be able to state that I have met a large number of them in charge of mines in this district. They are not backward in asking for information on any subject concerning which there is a doubt in their minds, and they make proper use of any suggestion which has a tendency to benefit their employers or employés. It is to be regretted that there are two other classes of mine bosses. One is a class which knows everything about coal mining and ventilating collieries. They have been raised in the mines, there is nothing in mining that is new to them, and they are greatly surprised at the audacity of anybody criticising their mode of working and ventilating, while they receive any and all suggestions with a very bad grace. The other class (whose members are few) are the men who do not pretend to know, and do not seem to care about knowing, anything of coal mining and ventilating. Their greatest desire is to get out the coal and run after the drivers. This class always goes home contented if the usual quantity of coal has been sent out. They have no time to spend in seeing that the collieries are properly worked, and cannot spare half an hour in looking after the ventilation, until the miners generally complain that they must stop work unless they are supplied with more air. Then they must act, though at an additional expense unnecessarily incurred.

Mine bosses in this district have to attend to numerous duties that the law never intended they should. In a large number of mines the mine boss must attend to everything without a single assistant. A man can do a certain amount of work right; but if he is given more than he can attend to, somebody must suffer. In these places the first duty of the mine boss is to see that all company men and boys go down at the proper time, and he generally goes himself about 6.30, A. M. He must stay around foot of slope or shaft until the whole machinery starts, instructing company men and drivers to do this, that, or some other piece of work, censuring them for some previous failure, or impressing on them the necessity of getting out equally as great an amount of coal as on the previous day, or listening to the complaint of first one and then another miner concerning what he wants to have done, or did not wish done. In the midst of these complaints a trip of cars goes off the track, or some other mishap comparatively trifling occurs, to the remedying of which he must give his personal attention; and so it goes on *ad infinitum* until the whole day is frittered away by him in attending to matters that should properly be in the charge of a deputy or deputies, leaving him free to supervise more important affairs, which are now more or less neglected. Especially is this neglect manifested in failure to visit the working places of the mine, which no man burdened as too many bosses are can properly do. Being aware that these mine bosses cannot comply with the law, is the reason of my writing thus.

While treating of mine bosses, I would call the attention of superintendents in this district to section eight of the "ventilation law," which explains in detail the duties of mine bosses and assistants, which reads as follows: "The better to secure the ventilation of every coal mine and colliery, and

provide for the safety of the men employed therein, otherwise, and in every respect, the owner or agent, as the case may be, in charge of every coal mine or colliery shall employ a competent and practical inside overseer, to be called mining boss, who shall keep a careful watch over the *ventilating* apparatus, over the airways, the traveling ways, the pumps and sumps, the timbering, to see, as the miners advance in their excavations, that all loose coal, slate, or rock overhead is carefully secured against falling; over the arrangements for signaling from the bottom to the top, and from the top to the bottom of the shaft or slope, over the metal tubes from the top to the bottom of shaft or slope for the purpose of talking through, and all things connected with and appertaining to the safety of men at work in the mine. He, or his assistants, shall examine carefully the workings of all mines generating explosive gases every morning before the miners enter the coal mine or colliery, and shall ascertain that the mine is free from danger; and the workmen shall not enter the mine until such examination has been made and reported, and the cause of danger, if any exist, be removed; and he or his assistant shall, also, every evening, when the workmen leave the mine or colliery, go over the mine and see that the doors of the passage ways are all properly closed, and that all the airways are free and unobstructed to the passage of air through them; and it shall be the duty of the mine boss to measure the ventilation at least once per week, at the inlet and outlet; also, at or near the face of all gangways, and all measurements shall be reported to the inspector once per month."

This section of mine law, although badly mixed, is very exacting in "mines generating explosive gases," but not so much so in other mines; yet I claim that the law means that all places shall be examined carefully, and that every day, to "see as the miners advance in their excavations, that all loose coal, slate, or rock overhead is carefully secured from falling," &c., which no mine boss can accomplish unless the place is visited by him or his assistants. The miner is advancing daily, therefore the law is intended to afford him daily protection. I shall endeavor to force compliance with this view of the law, but, if thwarted, must try some other way. All mine bosses should have assistants to help them in the performance of their many and arduous duties. Yet with all the care possibly taken, neither mine boss or assistants can always protect the men from danger. The miner himself has a duty to perform, and that is to endeavor to work his place according to instructions, and to take as few risks as possible. He should secure all doubtful pieces overhead, or have them taken down. He should never delay taking down any loose piece, as such delay is taking risks entirely too dangerous, as sad experience has shown. He should be very careful concerning the safety of his laborer, as the latter is under his charge, and he is responsible for his preservation from harm. While the laborer may know the danger, nevertheless it is the miner's duty to see that he is protected as if he knew nothing about the risks he runs. From my investigations of the numerous accidents arising through falls of coal,

slate or rock, I am convinced that a large number of them could have been avoided if the mine boss or assistants had lived up to the requirements of the law by visiting the places at least once per day, and insisting that miners should take the proper precautions against falling material, by removing such as could be taken down and securing all others. I know from experience that it is a hard thing to get a miner to take down a piece that he considers safe, but when the mine boss is firmly convinced that it is unsafe, the best remedy that I know of for curing an obstinate miner is to refuse him any cars until he has complied with the proper requirements.

In this, my first report, I have written of things in a general way, which, perhaps, is not entirely right, as the majority of operators and bosses in this district are doing all they can towards bettering the condition of their collieries and to lessen the number of accidents. But unless there is a great improvement in some of the collieries in 1882, my next report will treat of them individually, which will not be pleasant for me to do, nor agreeable to the parties concerned.

Strippings.

This is a term applied to the mining of coal by first removing the surface, a process that is carried on extensively in several places in this district—Coleraine, Yorktown, Beaver Brook, No. 6, Milnesville, and Hollywood, Nos. 1 and 2. The last named places, operated by Calvin Pardee & Co., are the most extensive thus far. The thickness of the cover at these places varies from eight to eighty feet; the thickest body taken off to present time, was forty feet, the average thickness being about thirty feet. The thickness of coal varies from fourteen to fifty feet, averaging at least thirty feet. Where the coal is thickest, the three seams (Mammoth, Parlor, and Wharton) come together, the dividing slate between either not exceeding two feet in thickness. Thirty thousand dollars were expended in 1881 at the Hollywood strippings, figures that indicate the magnitude of the work done. It is right to state, that a portion of this heavy expense was paid by the land owners, which they could well afford to do, as in the ordinary way of mining not more than one third of this coal could have been taken out, as there is no rock cover over the coal except a little in the centers of the basins; but by their present way of stripping, all the coal can be taken out. A royalty of twenty cents per ton will pay the owners of this property better than fifty cents per ton would by old method of mining.

There is a large area of available coal in the different basins of this district that can be mined profitably by stripping, if the different land owners will act reasonably. They can afford, indeed, to be liberal, as ten cents per ton royalty is better than no royalty at all. It is an open question yet how much coal can be mined in this way, as no company, so far, can give definite figures on the matter; but I think the past experience of those concerned will bear me out in saying that for every foot of coal two feet of covering can be removed, and that with profit to all concerned, if land owners will bear a part of the expense of uncovering. The approximate number of

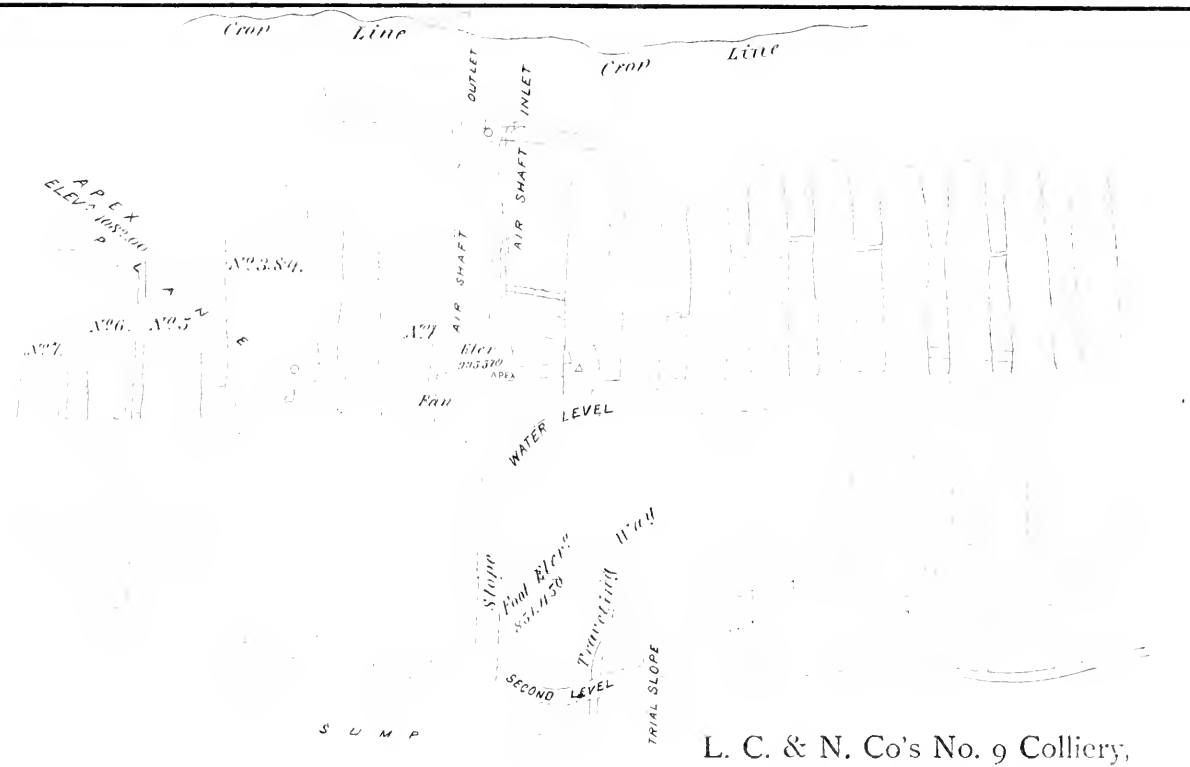
tons mined by stripping in this district in 1881, was three hundred and fifty thousand tons.

Mine Fires.

This district was visited by two mine fires during 1881. The first took place in Sandy Run colliery, operated by M. S. Kemmerer & Co. On the 1st day of March, at 5.30, A. M., the watchman discovered flames issuing from the pumpway, which was near the slope. A strong force of men were soon at work endeavoring to save the breaker and other buildings which were in danger. As soon as possible, all the openings leading into the mine were covered with T iron rails and sheet iron, on which clay and ashes were piled in quantities sufficient to exclude all the air. Two pumps were put in operation to throw water down the pumpway, and wherever any sign of fire was visible. By five o'clock the same evening the fire was under control; then hose was taken down slope and gradually worked through the cross-cuts towards the pumpway, which was thoroughly drenched with water. By noon the next day the fire was entirely extinguished. These few hours, however, made great destruction of property. All the timbers in the pumpway were burned, the column pipe broken in several places, while the large pump at the bottom was thrown on its side. The heat was so great in the slope, as to bend a large number of rails, compelling the re-laying of a considerable portion of the track. During the fire, so large a body of water accumulated in the slope that it was found necessary to put in, temporarily, two eight-inch pumps to throw out the water while the necessary repairs were made on column pipe, pump, and pumpway. In one week coal was being hoisted again.

Fire at No. 9, Lehigh Coal and Navigation Company, Lansford.

This fire, which occurred on the 29th day of July, 1881, which deprived the company of one of its best collieries, was caused by one of the hoisting engineers entering one of the passages with an unprotected light. In this passage-way a steam pipe had been placed, and the timbers, which had become very dry from the heat of said pipe, were ignited by a spark from his lamp. A strong current of air was being forced through this passage-way, for the purpose of cooling and ventilating it, which caused the fire to extend very rapidly, so that before it could be brought under control, it had extended to the upper part of the mine, where it could not be reached with water. It then became necessary to close all the mine openings, and steam from thirty boilers was forced in to endeavor to extinguish it. From the inside of tunnel, this was carried through a wooden brattice in gangways and air-ways above and below water level, aiming at the lower gangways, in order to reduce the strong current of air which was feeding the fire through the numerous inlets. This brattice was made by nailing two thicknesses of two-inch planks to uprights of seven by nine inch scantlings. After having cut an offset in the coal for twelve or fifteen inches, the planks were fitted closely, and tightly caulked with oakum, making a perfectly air-tight



L. C. & N. Co's No. 9 Colliery,

Showing location of Fire and Brattices.

SCALE, 185 feet to one inch.

* Fire Originated.

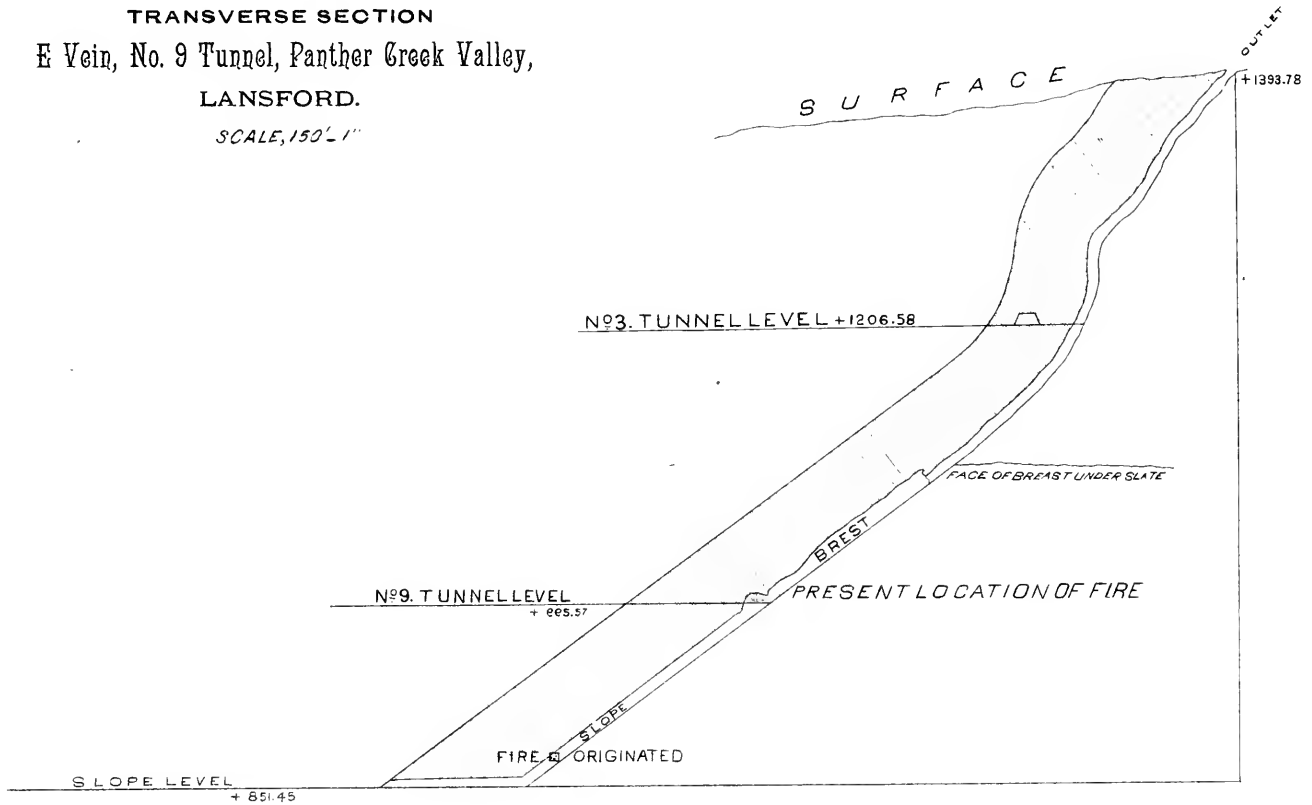
Δ Present Location.

Brattices.

TRANSVERSE SECTION

E Vein, No. 9 Tunnel, Panther Creek Valley, LANSFORD.

SCALE, 150'-1"



brattice. In September, two bore holes were put down from surface, and experiments were made to test whether the fire was out or not, and failing to discover any trace of fire, in the early part of October, the steam was discontinued, and, in due time, the mine was partly re-opened. From the effect of the great heat and dampness arising from the steam, a great amount of damage was done to the colliery, such as the closing of gangways and airways.

The work of re-opening was pushed forward vigorously, and much progress had been made, when, January 1, 1882, evidence of sulphur was again found, which caused apprehension that the fire was still burning in a certain portion of the mine. Again all the openings were closed, and the introduction of steam renewed. As a further precaution, the company have decided to build wooden dams; one in No. 9 tunnel, and the other in the east gangway of Foster tunnel, which are expected to confine the water and fill the mine one hundred and thirteen feet perpendicular. Mine officials believe if the water can be raised to that height, that the fire will be extinguished beyond a doubt. By referring to map, the place the fire originated, its present location, and all the brattices to cut off the air-currents will be seen. The seam at this place is about sixty-five feet thick, at an angle of about thirty-five degrees, and some of the benches have been mined over twenty years ago, which are closed at present, preventing the exploration of all the places, and their only safe plan is to flood it, as water will find all the openings and cracks above and below the seam. In my next report, I hope to be able to give a detailed account of this fire.

The Importance of Leveling in Coal Mines.

In arranging and examining the maps of the various collieries in this district, the importance of knowing the elevations of the inside workings, and the surface overlying them, has forcibly presented itself to my mind. Some of the maps have no levels marked upon them; others (notably those in charge of the L. V. R. R. engineers) have these lines marked from tide datum, and as this datum is that from which barometrical observation are usually noted, it should also be the datum from which all levels are taken, which would enable those concerned to compare the depth of various basins, as well as adjoining collieries in the same basin; such datum could be readily ascertained from branch railroads leading to the different colleries. I think it very essential to safe and intelligent mining. There is, however, another and more important reason for having the levels taken, and marked on the maps, *i. e.* knowing the vertical distances between the different seams of coal in the same colliery or basin, which is necessary for the future safety of coal mining in the lower seams. When more than one seam of coal is mined, or likely to be mined in the future, the thickness of intervening strata should be known, as it is subject to great variations. For instance, in the Big Black Creek basin, the distances between the Mammoth and Wharton seams vary from seventy-five feet to less than seven feet; therefore, levels should be taken at proper distances, and plainly marked

upon the maps, that officials in charge can always have a safe guide in opening up the lower seams. Knowing the thickness of overlying strata, common sense would teach them not to mine too extensively where the seams of coal are near each other. The attention of those concerned—land owners as well as operators—is called to this important matter, for the reason that there are several large collieries in this district where the top seams are nearly exhausted will soon be abandoned, and allowed to fill with water, as several collieries have been in the past. Now is the time to attend to this too-long neglected duty. The importance of having these levels taken (if longer neglected) will be manifested forcibly and expensively to future coal operators; they will be in constant fear of being drowned out by water from overlying workings, and their employés, fearing the danger, will not work until safety is assured, which will only be by draining the water away. To avoid this extra expense and peril the next Legislature should pass an act making it compulsory on land owners and operators to keep their old-abandoned collieries drained, or have the levels taken and properly marked on each map, (the company's and inspectors' maps.) so as to avoid any possibility of future inundations of collieries, and also to avoid the terrible loss of life that would follow such accidents, a loss which cannot be computed, as so many collieries in the same basin are connected, through a very unwise policy of the past.

Boundary Pillars.

This subject deserves the attention of all parties interested in coal mining, especially the operators and land owners. Each side of a boundary line should have at least fifty feet of coal left untouched, which would make a pillar of one hundred feet wide between the collieries. The size of these pillars should vary according to circumstances. In thick seams like the Mammoth, the pillars should be wider than in small seams like the Wharton. Their size should also be regulated by the character of the immediate overlying strata, the vertical heighth to next overlying seam, and it should be especially regulated by the vertical thickness or heighth of the different strata to the surface. For instance, a vertical height of one hundred and fifty feet does not need as strong a pillar as a vertical heighth of three hundred feet. The character of all overlying strata, the thickness and number of coal seams should also be considered. Enough boundary pillars should be left in to hold up the overlying strata of whatever character and thickness it may be, as they will eventually have to bear all the weight; for those left in to-day will prove worthless when the crumbling mass above begins to move. I know of several mines where one hundred feet of pillars were marked to be left in, but with a recklessness bordering on criminality they have been mined from both sides until there is left only a shell of a few feet. In other mines they never had a pillar, and there is nothing to show the boundary line inside. The advantages of having large boundary pillars are many and very important. Mine fires, sudden flooding, and

general caving in of mines are among the things of to-day, and will, in the future, work much more ruinous effects. Mine fires can only be extinguished effectually by water, yet no company has a right to flood its colliery or collieries, if in so doing it also floods adjoining collieries. In the case of a sudden flooding of a colliery or collieries, proper pillars would keep the water within bounds, and other collieries would not be affected, and costly litigations would be avoided. General caving in, such as the Harleigh disaster in 1877, is liable to occur at any time, and without this strong barrier other collieries are in danger of being ruined. Another and perhaps the most important reason is this: Different collieries in the same basin will not be exhausted at the same time, and probably not for an interval of years. The owners of those first exhausted will, of course, remove their pumping machinery, and leave the abandoned places to fill up with water, sufficiently perhaps to drown out all the other collieries in the same basin, unless new and powerful machinery is put in. Then the point to decide will be, whether it will pay the company or companies still mining to make such addition to expenses. If they can see a small margin of profit they will do it; otherwise, they will have to abandon their mine or mines. I have no hesitation in saying that a large amount of anthracite coal, which could be mined with judicious forethought, will be lost in this way unless this matter is attended to, and that very soon, by some party having authority to compel compliance with its order. I respectfully call the attention of Senators and Representatives from the anthracite regions to these subjects, as they are of special importance to their constituents.

Furthermore, in my opinion it would be a wise policy to have a solid pillar between all collieries, even when they belong to the same company and same land owner. Reasons given before are applicable to this case. Mine fires are the greatest agencies of destruction that modern mining has to overcome, and the most difficult to conquer. There are many mine fires to-day in the anthracite coal fields which could be easily controlled if these pillars were left in so the mine could have been flooded. The flooding of some of the mines to-day would mean the flooding of all the adjoining collieries, and that no company could stand, consequently, the fire is fought by other methods which, so far, have been very unsuccessful. Many objections can be raised against flooding mines, yet personal experience, and that of others, points to this as the only sure remedy to combat and subdue fires in extensive mines. To prove this, I will mention the Empire shaft fire in 1866, (which was under my immediate charge,) the Wadesville shaft fire, the Prospect shaft fire, the Stockton fire, the Audenried shaft fire, the Lansford (No. 4 slope) fire, and last, the Keeley Run fire, which were all successfully put out by flooding. Other fires that I could mention, that cannot be flooded for reasons given, are burning to-day, and will continue for an indefinite period, entailing great loss to operators and land owners.

COLLIERY IMPROVEMENTS.

As will be seen by the following statement, the companies in this district have made extensive improvements during the past year, enabling them to largely increase their shipments the coming year, if necessary.

Improvements at Sandy Run, operated by M. S. Kemmerer & Co.

At No. 2 slope, a large Allison pump was put in, substantially erected on stone foundation, firmly bound together by hydraulic cement. Size, 36″×16″×72″, with a new fourteen-inch column pipe from pump to surface.

No. 3 west, a new sixteen feet diameter fan was put up, built by the Vulcan Iron Works, Wilkes-Barre, with a capacity of fifty thousand cubic feet of air per minute at ordinary speed, driven by 14″×18″ vertical engine. This fan was greatly needed, as ventilation was very poor.

At west No. 2, a pair of 14″×24″ hoisting engines has been erected for the sinking of and hoisting coal from No. 4 slope, now being sunk. At present writing, January 1, 1882, the slope is down ninety yards. It is sunk on the north dip of No. 2 basin, B seam, and is intended to be sunk to the basin; a second opening will be driven on the other pitch. A reservoir has been built above the town to supply the employés, live stock, and boilers with fresh water from a creek in the vicinity. The water flows in covered wooden pipes a distance of three thousand feet. From that point it is pumped by a Blake 14″×8″×12″, two hundred and fifty feet vertically through two thousand feet of three inch gas pipes. Houses for a superintendent, book-keeper, mine boss, and store clerk have been built, and four blocks of miners' houses are now in course of erection. All the houses in the place have been painted, making it a model town in the coal fields.

Improvements at Upper Lehigh.

The sinking of a single track slope in the Green mountain basin has been completed. The length of slope is seven hundred and forty-five feet, with an average pitch of 12°. The distance from foot of slope to bottom of second opening on other pitch is two hundred and twenty feet. The extent of second opening on north side is two hundred and seventeen feet, at an angle of 23°. The distance on surface, from mouth of slope to top of second opening is one thousand one hundred feet. The sump is being made, and the necessary pumps will be put in without delay. The hoisting machinery—a sixty horse-power engine—is in position; it is supplied with steam from four new cylinder boilers, 34″ × 36′. The coal from this new slope, known as No. 5, will be taken to No. 1 breaker for preparation. To do this two miles of railroad was built, over which the cars will be transported by a small locomotive. Near this slope two blocks of tenement houses have been built. Another slope (No. 6) is being sunk on the south side of main basin, three thousand seven hundred feet east of No. 4 slope. This work has only temporary machinery. In No. 4 they have driven west in the trough four hundred and fifteen feet, to dip at an angle of 1° to 4°. This place does not need any hoisting machinery.

Colliery Improvements at Buck Mountain.

This company is sinking a new slope in a small basin, the extent of which is unknown at present. One twenty horse-power engine, with two cylinder boilers, have been temporarily put up for exploring purposes. An underground slope (No. 7) has been sunk in the B seam. Its length is two hundred and fifty feet, at an angle of 25°. The steam for hoisting at this slope is taken from the surface through a ten inch bore hole one hundred and forty feet deep. To ventilate this slope a new sixteen foot fan has been erected, which makes the ventilation very good, with prospect of so continuing, unless the airways are allowed to be driven too small.

Improvements at Council Ridge, operated by J. Leisenring & Co.

The boilers have all been taken out of the mines, and placed in a convenient point on the surface, from which the steam is taken to inside engines through a bore hole with a diameter of eight inches, and a depth of one hundred and seventy-nine feet. The fan which was idle at No. 2, has been moved to No. 5, which will improve the ventilation of both mines as soon as the new air connections have been made, and the inlet to No. 5 has been enlarged. Ventilation here has been poor, but prospects are better for the future.

Improvements at the Jeddo Collieries, operated by G. B. Markle & Co.

Oak Dale No. 1.—This breaker was greatly improved during last summer. New coal chutes were added, a new boiler house built, and six new cylinder boilers, $33'' \times 30'$ put in.

Oak Dale No. 2.—A new boiler house has been built, and six new cylinder boilers $33'' \times 30'$ were added to their former number. A tunnel was driven from the gangway on south side of basin to a point in the slope on the north side. The size of this tunnel is $14' \times 7'$, and two hundred and thirteen feet long. By the driving of said tunnel, ninety-six feet of slope, at an angle of 45° have been abandoned. Ventilation in No. 1 and No. 2 should be improved. About one thousand feet west of Oak Dale No. 1, an artesian well has been sunk four hundred and thirty feet deep, which yields about fifteen gallons of water per minute. Highland No. 1 and 2 breakers have been extensively improved, new chutes, pockets, &c., being added. Two reservoirs, respectively $30' \times 60' \times 5'$ and $45' \times 40' \times 8'$ in size, have been constructed, to make up any future deficiency in fresh water. Telephonic communications have been made between the main office at Jeddo and the four collieries.

Colliery Improvements at Ebervale.

Two small slopes, lengths respectively one hundred and seventy-five and three hundred and fifty feet, have been sunk on the south side of main basin, in order to get at the coal in a local basin; they will produce considerable coal. The same hoisting machinery operates both slopes, getting its steam from No. 3 boilers.

At No. 3, Two large pumps have been put in, one a Duplex of Clarke's make, and an Allison made at Jeanesville. The Duplex 31″×15″×48″, the Allison 31¼″×14¼″×48″. Their respective capacities are twenty-two hundred and twelve hundred and fifty gallons per minute. The breaker has been all re-built, making it one of the best in this region; new chutes, pockets, screens, jigs, rollers, etc., were added. It has now a capacity of one thousand tons per day. A new boiler-house with ten additional boilers 33″×30′ has been erected. At their different collieries twenty-six new boilers 33″×30′ have been put in to re-place old ones.

Gangways, airways and slopes have been re-timbered. All these improvements have put this company in good condition to ship large quantities of coal in 1882.

Improvements at Harleigh Collieries, operated by McNair & Co.

A new slope eighty yards in length has been sunk about four hundred and fifty feet east of No. 1, on the south dip of the Mammoth at an angle of 15°. It is the intention to continue the same eighty yards further to get at the coal in No. 3, which was lost by the caving-in during 1877. Also a slope has been graded over an anticlinal from a local basin lying north of main basin to the regular Mammoth basin, two hundred and fifty yards west of slope No. 1. From the north basin it goes up two hundred feet, at an angle of 10° to the top of saddle; then down the south dip two hundred feet at an angle of 16°. This work is so constructed to get at the coal that lies north of main basin. The breaker has been greatly improved, rolls, jigs, elevators, etc., being added and many other improvements made. This company is in good shape to ship a large quantity of coal in 1882, which speaks volumes for its perseverance and skill, in opening up an apparently worthless, abandoned mine.

Improvements at East Sugar Loaf, operated by Linderman, Skeer & Co.

OLD No. 1 is being reopened for a permanent pumpway, and as an additional inlet to No. 2, will help the ventilation greatly.

AT No. 2, the first left gangway is being reopened under third lift of old No. 3. By its reopening, it is expected to gain access to a large quantity of coal. This slope has recovered from the effects of being drowned out last March, when the creek broke into No. 5, from whence it ran into No. 2, which was one lift lower. On account of this fall, the company determined to change the bed of the creek, and for that purpose a new channel was at once begun, and continued over the center of the basin. The length of this channel will be about two miles, its width twenty feet, with an average depth of five feet. By this the creek is concentrated and placed on safe ground. This enterprise is expected to liberate half a million tons of coal, which was practically lost.

AT WEST No. 1, a new slope is being sunk, while a new breaker is being built, with an engine and house, boiler-house, and all other necessary build-

ings, a description of which will be given in detail at the proper time. A new slope at No. 4, has been finished, which will open up an extensive basin of coal, that was practically untouched, besides doing away with inside plane and counter chute. The ventilation of these several mines has been greatly benefited by the re-timbering and enlarging of the airways.

Improvements at the Cross Creek Collieries, operated by Coxe Bros. & Co.

At Gowen the tunnel on the north side of creek has been driven in from the supposed split of the Mammoth, cutting, at a distance of two hundred and forty feet, the Wharton seam and is now in three hundred and thirty-six feet, being driven to cut the B seam, which is supposed to be two hundred feet beyond the Wharton. On the south side the gangway from the drift tunnel has been driven to the east six hundred and fifty feet, and to the west nine hundred feet, connecting with the east gangway of slope No. 1. About a mile west of the gap, slope No. 3 has been started, being sunk north on the Buck mountain seam. The breaker is finished, and the colliery has been shipping coal since June 16.

At Derringer.—A water level gangway is being driven on the south side of the saddle upon which the breaker is located; a similar gangway is also being driven on the north side of the saddle. The slope has been sunk three hundred and sixty-eight feet, and gangways were turned but stopped until the breaker is ready for work.

At Tomhicken.—A shaft 23′×13′ has been started, which will have two hoisting and one pumping compartments. The shaft will cut three seams as shown by the Diamond drill hole. A temporary slope is also being sunk west of the shaft in order that the breaker may be started with a good supply of coal, as it will take some time to get the shaft sunk. Another slope is being sunk in the south basin about three thousand feet west of the shaft. The coal will be brought to shaft breaker over ground at present; perhaps ultimately underground.

At Tomhicken, Derringer and Gowen, fifty-four tenement houses have been built, and sixty-six more are in process of construction.

Drifton, No. 2.—Slope has been sunk to the basin and three lifts opened, thus preparing for large shipments. A tunnel in No. 1 has been finished, cutting the south dip of B seam. Large machine shops have been erected near No. 2, to build and repair machinery for the collieries. The latest improved machinery is in these shops. Eighteen tenement-houses have been built.

Realizing the imperative necessity that exists in this district for some building wherein maimed or injured persons can receive promptly the medical and surgical treatment their misfortune requires, the Messrs. Coxe, have erected a neat, commodious, and well-situated hospital in Drifton, wherein miners or laborers injured in their employ will, if they so wish, receive every attention necessary in case of accident. Of this structure the following detailed description will be both appropriate and instructive reading:

The hospital consists essentially of two parts, the front building, which

contains on the first floor the apothecary's shop and operating room for the surgeons, and two parlors or sitting-rooms, one being intended for the family of the person in charge of the hospital, the other for the resident physician. The second story of the main building contains four bed-rooms, bath-room, and closet, and the third floor two bed-rooms. There is also a large cellar under the main building. The ground sloping to the east allows a series of rooms on a level with cellar of main building, and, also, provides excellent drainage. On the ground floor, at the extreme end, is a large kitchen, provided with cooking ranges, hot and cold water, sinks, and everything necessary for preparing food, etc. A laundry, wash-room, and drying-room, heated by steam, are provided. A pleasant sitting-room for convalescent patients. Next to this are linen and sewing-rooms. Between these latter and the cellar are two large spaces, which are intended to contain the steam-heating apparatus. The hospital will be lighted with gas, heated with steam from the boilers of No. 1 breaker, at Drifton, and supplied with water from an artesian well five hundred feet deep, which is about one hundred and fifty feet from the building. The portions of the building occupied by the patients will be heated by indirect radiation, *i. e.* the pipes will all be in the lower part of the building. Fresh air will be brought from the outside, passed over the pipes, heated by steam, and carried from there into various parts of the building occupied by patients, so as to insure a constant supply of fresh and properly treated air. The main floor of the back part of the building is for sick patients. It is divided into four wards, the largest facing the south, accommodating six beds; the next size four, and the two smaller wards one bed each. The two latter are intended for patients suffering from contagious diseases and weak nerves. In rear of these wards are dining, store, and bath-rooms, and two water closets. There is also a large entry or hall, (with a dumb-waiter going down to the kitchen,) from which all these rooms open, and from which also a stair case descends to the kitchen. This enables all the food and linen to be carried to and from the kitchen and wash-room without going through the main house. The ceiling of the wards will be from fourteen to eighteen feet high, averaging about seventeen feet, thus giving a very large number of cubic feet of air space for each patient. There is a large porch in front of the building, about twelve feet wide. This porch is so arranged that the sun will be on it from nine o'clock in the morning until it sets; the building generally has been so placed as to receive very much sun. It has also been located convenient to the works in order that persons sustaining slight injuries can be dressed at the hospital before being sent home. Plans of the building are annexed.

Scale, one quarter inch to the foot.

Improvements at Black Ridge Colliery.

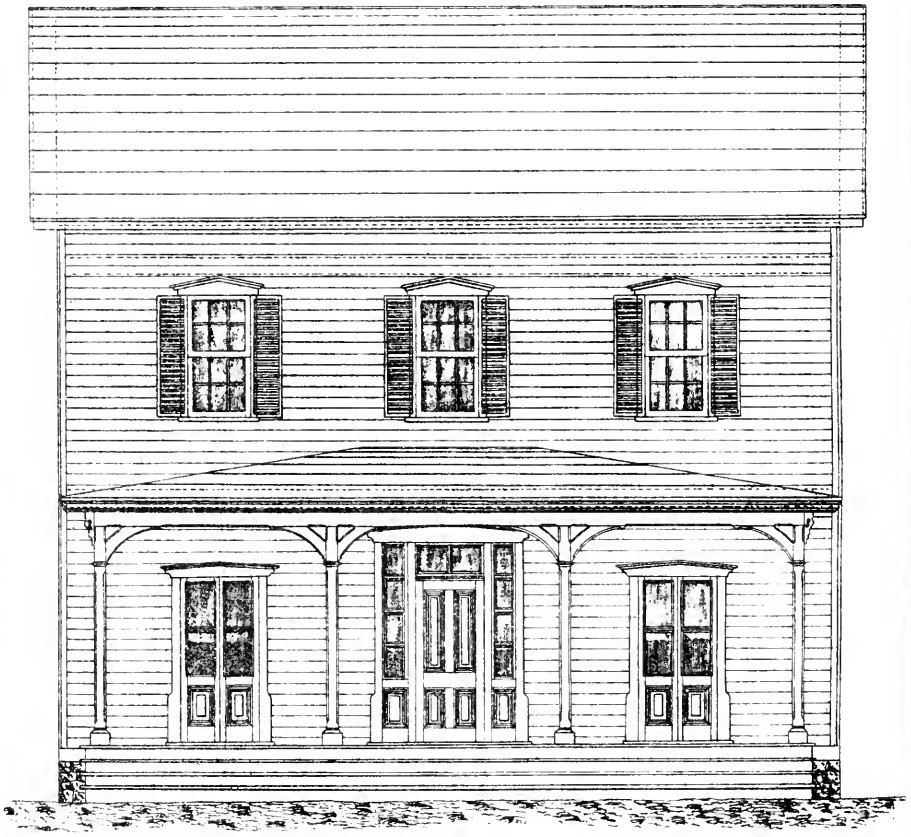
A new breaker has been built and fitted out with the best machinery, everything being of a substantial order. The capacity of the breaker is

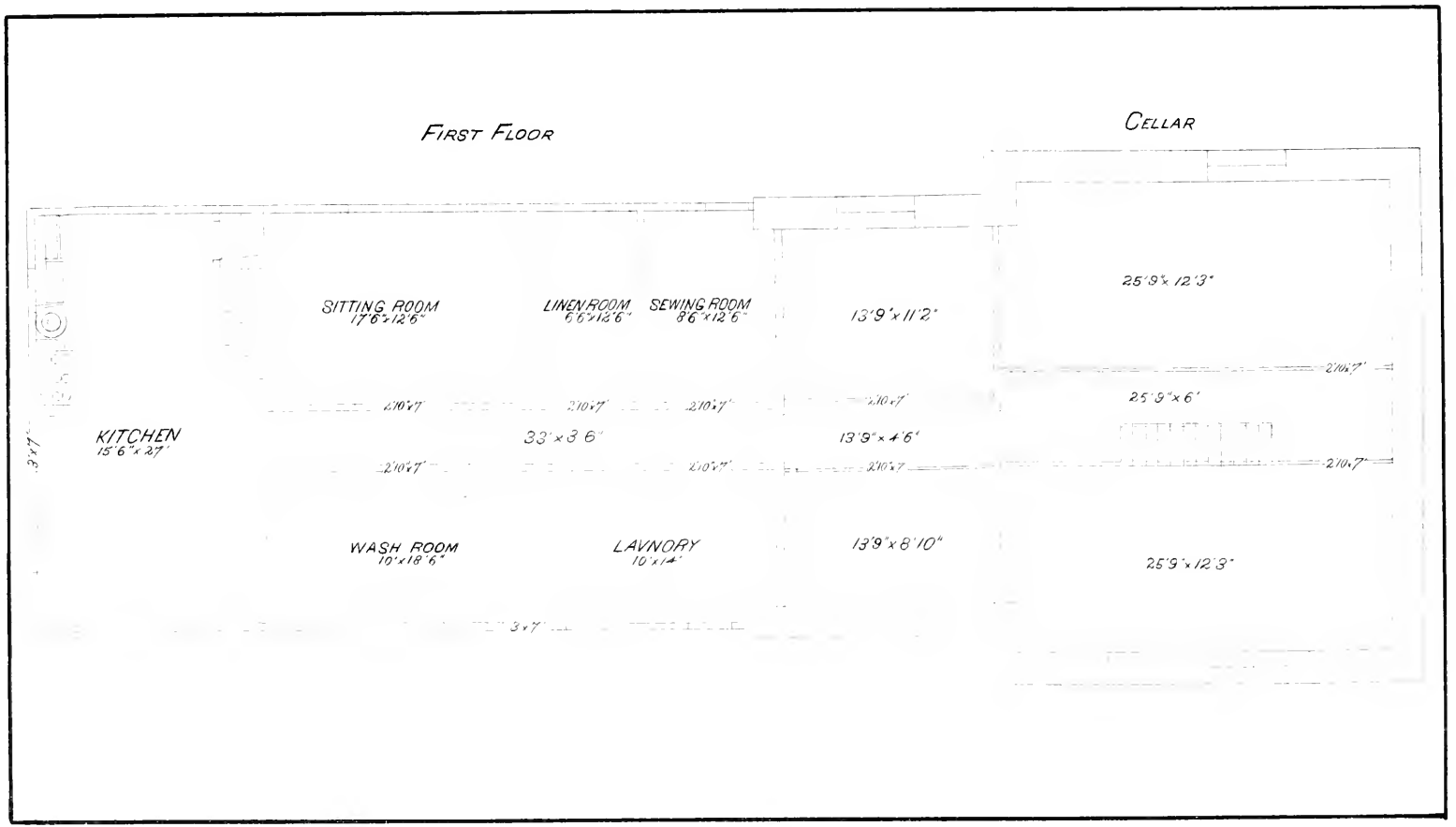
HOSPITAL

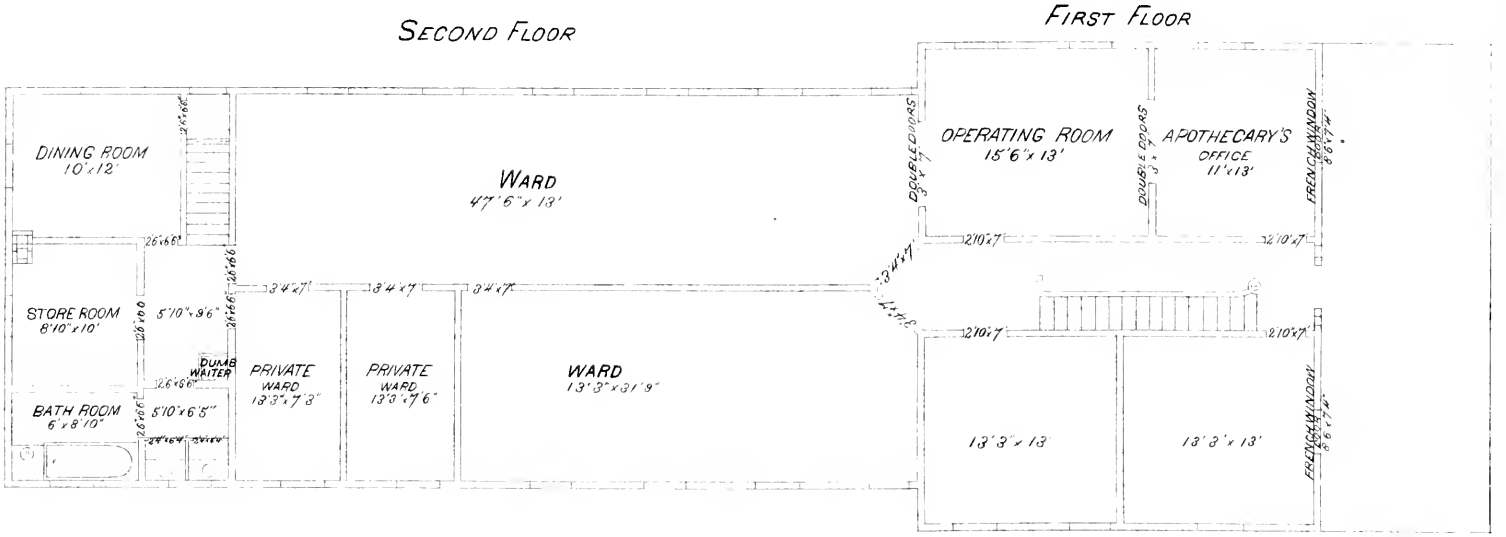
FRONT ELEVATION

SCALE 1/8 IN

COXE BROS. & CO.
DRIFTON
JEDDO P. O.,
LUZERNE CO., PA.

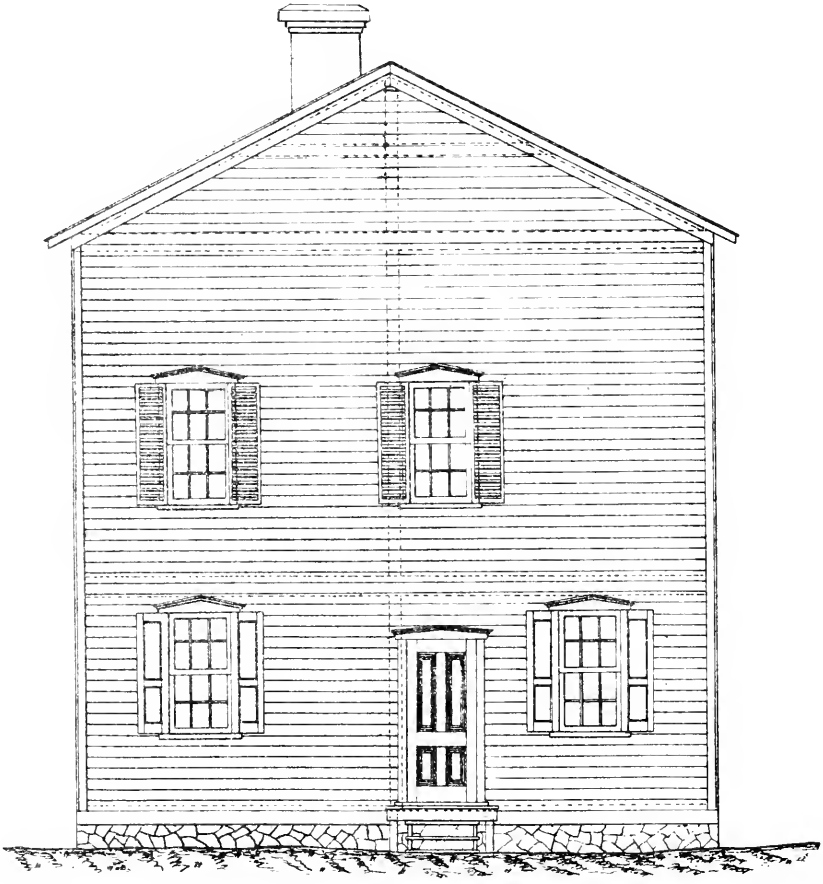



FIRST FLOOR
CELLAR
SITTING ROOM
17'6" x 12'6"
LINEN ROOM
6'6" x 12'6"
SEWING ROOM
8'6" x 12'6"
13'9" x 11'2"
25'9" x 12'3"
2'10" x 7'
25'9" x 6'
KITCHEN
15'6" x 21'
33' x 3'6"
13'9" x 4'6"
WASH ROOM
10' x 18'6"
LAVNDRY
10' x 14'
13'9" x 8'10"
25'9" x 12'3"
3' x 7'


SECOND FLOOR
FIRST FLOOR
DINING ROOM
10'x12'
WARD
47'6"x13'
STORE ROOM
8'10"x10'
BATH ROOM
6'x8'10"
DUMB WAITER
PRIVATE WARD
13'3"x7'3"
PRIVATE WARD
13'3"x7'6"
WARD
13'3"x31'9"
OPERATING ROOM
15'6"x13'
APOTHECARY'S OFFICE
11'x13'
DOUBLE DOORS
FRENCH WINDOW
13'3"x13'
13'3"x13'

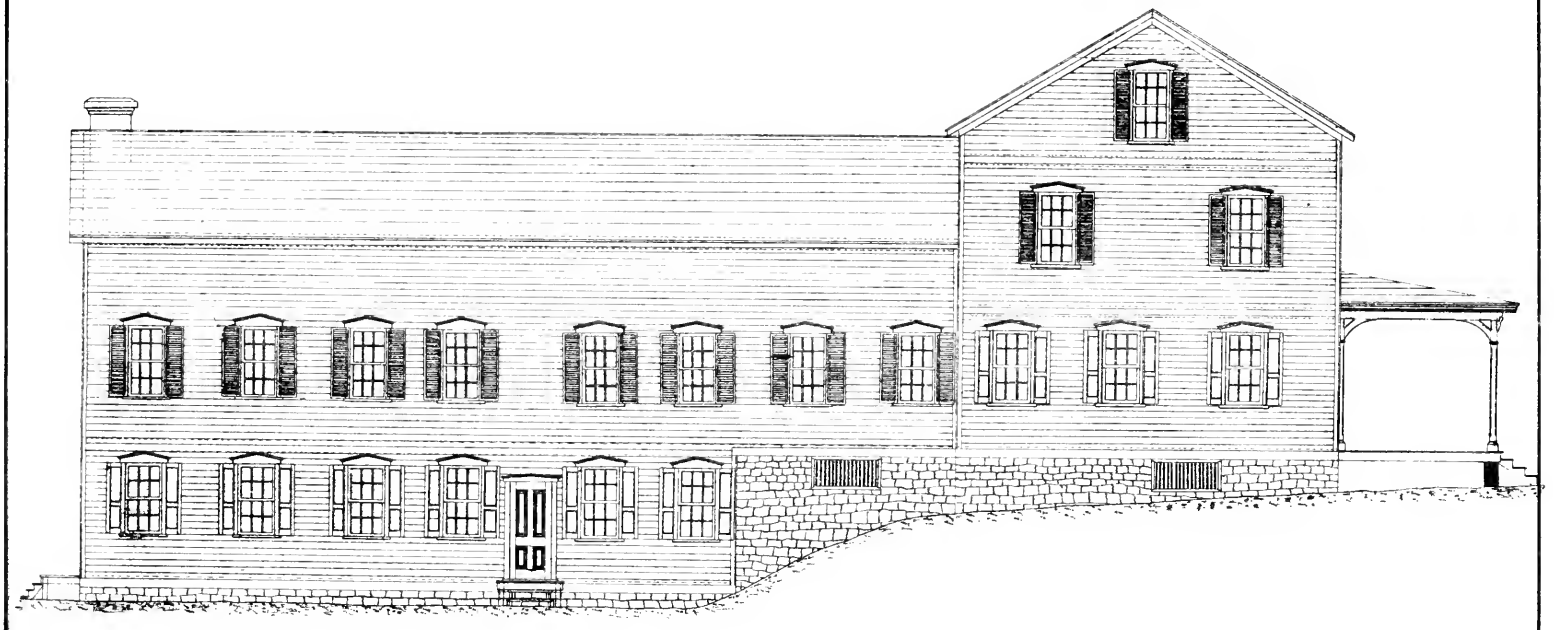
HOSPITAL

EAST ELEVATION



HOSPITAL

NORTH ELEVATION



between six hundred and seven hundred tons per day. One inlet and one outlet has been driven to the surface of the mine from the bottom seam, which they call the Mammoth. These are in size, respectively, 7′×20′ and 7′×12′. Two traveling ways have been made in the middle seam to the surface, one east and one west of slope, at an angle of 47°. A plane, 14′×7′ has been driven between the bottom and middle seams, to do away with the counter chutes. Two pumps have been put in, an "Allison," 32″×14″×72″, and a "Cameron," $16\frac{3}{4}$″×$10\frac{1}{2}$″×18″. A saw-mill has also been erected, which is driven by a twenty horse-power engine.

Improvements at Coleraine Collieries, operated by W. T. Carter & Co.

At No. 1, a new plane has been driven nine hundred feet long to do away with about four thousand feet of "runs." To get the coal to the top of the new plane fourteen hundred feet of gangway had to be opened through old workings.

At No. 2, an inside slope is sunk in the Wharton to the depth of four hundred and fifty feet. All the necessary hoisting machinery has been erected. Additional boilers have been put in. A new pump, 30″×14″×60″ has been placed at the bottom of this slope, four thousand feet of additional water pipes have been laid, which, with what they had before, makes eleven thousand feet, and connected with what is regarded as an exhaustless spring of water on the Spring mountain. They are also enlarging some of their airways, which, when completed, will improve ventilation of the mines.

Yorktown Colliery Improvements, operated by G. H. Myers & Co.

At No. 5, a tunnel has been driven from the Mammoth to the Wharton, and cuts the coal of the usual thickness and good quality. At Tresckow, a forty horse-power hoisting engine has been erected, as well as a new boiler-house, with eight new cylinder boilers, 34″×30′. Two "Cameron" pumps, 22″×14″×20″, with six hundred feet 8″ column pipe, have been put in, for the purpose of draining an old abandoned slope. This drainage was necessary in order to obtain a large amount of coal that otherwise would be lost. A new slope is being sunk in the Mammoth, which will be completed early in 1882. Four thousand feet of 2″ water pipe were laid from No. 5 to Tresckow, to supply fresh water to the boilers.

Improvements at Audenried Colliery, operated by E. B. Leisenring.

A new slope, one hundred and forty yards, has been sunk in the Wharton seam, and the necessary hoisting machinery and boilers have been put up. The coal from this slope is to be prepared at Tresckow breaker, and for its transportation a railroad four thousand five hundred feet long has been built.

Beaver Brook Colliery Improvements, operated by Charles M. Dodson & Co.

An old slope, sunk on the south dip of B seam, and abandoned in 1875, is being reopened. The slope is clear of water, and they are commencing

to open gangways at one hundred and twenty yards from surface. The seam is nine feet in thickness at this place, 6′ 8″ being clean coal. Pumps have been put in, while a pair of hoisting engines 14″×24″, a new boiler-house with eight new cylinder boilers 34″×30′, and all necessary buildings for starting operation, are ready. The coal will be taken to No. 2 breaker, a distance of two thousand five hundred feet, railroad connections being made.

Colliery Improvements at the Different Mines, operated by A. Pardee & Co.

AT LAUREL HILL.—Two tunnels have been completed from the Mammoth seam to the Wharton, which latter was found to average ten feet in thickness. The gangways have been driven several hundred yards, while the second openings have been driven to the surface. The coal at present is dumped into a counter chute, which conveys it to a gangway below in the Mammoth. A gravity plane is now completed, and when the gangway is driven far enough, all the Wharton and Mammoth coal will go by it to the slope, thus doing away with the counter chute. The tunnel mentioned in last report has been completed, finding the two splits of the Mammoth previously proved by diamond drill; other provings are now being driven with every prospect of ultimate success. One Allison pump, 36″×16″×72″, and four new boilers 33″×30′ have been put in. A plane has been built on the surface near the eastern end of breaker, for the purpose of removing the slate, dirt, and fine coal made in preparation.

A new slope, No. 7, is being sunk on the north dip of the Mammoth seam, at the western limits of Hazleton borough, to take the coal from the bottom of the basin.

AT No. 6.—An addition has been made to the breaker, while a second pea coal screen and a set of elevators have been put in.

AT No. 3.—The new breaker is completed, and is one of the finest structures in the county, being fitted all through with the most improved machinery for the preparation of coal, having a capacity of one thousand tons per day. Thirteen additional boilers, (nine 33″×36′, and four 33″×30′,) with suitable buildings, have been erected. Openings are being made to locate a twenty-feet diameter fan, for the purpose of improving the ventilation in a part of No. 3, and a section of Hazleton mine. Tunnels have been driven to the Wharton seam on first and second lifts, coal being found in good condition. Two new "Thatcher" pumps, respectively 24½″×15″×72″, 24½″×12½″×36″, and one "Allison," 36″×16″×72″, have been substantially erected. An artesian well, commenced in the summer of 1880, was completed this year. At the depth of four hundred and twenty-four feet a good stream of water was struck, which has been yielding one hundred gallons of water per minute, which is generally used for boilers.

HAZLETON MINES.—A bore-hole, 16″ in diameter, was put down from the surface, over the gangway of present workings, its depth being four hundred and sixty-three feet, to carry steam for the sinking and working of an underground slope. This slope was sunk two hundred and fifty feet to a

synclinal, and now gangways are being driven on both dips. The hoisting machinery for this last slope is a pair of 14″×24″ engines. Another pair, 18″×30″, have replaced the old single engine on surface. The breaker has been improved, a new set of elevators put in, &c., which adds greatly to its capacity.

Cranberry.—A sixteen-feet diameter fan, with an engine 12″×18″, has been put in, which ventilates the Wharton on both dips, and the inside slope in Mammoth. The tunnel on south side of basin has reached the Wharton, showing it to be in fair condition. The second opening is completed. In the east gangway, on the north side, a fault prevented further operations, and a tunnel was driven north a distance of ninety-seven yards, where it struck the Parlor seam, (a local name,) which is six feet three inches in thickness, four feet being good coal, and two feet three inches bone and rough coal. The tunnel was continued to the Wharton, about three hundred feet further, striking the seam at an average thickness. A second opening is being driven to the surface. Seven new boilers, 33″×30′, were added during the year.

Crystal Ridge.—A plane is being driven and nearly finished, to take the coal from a counter gangway, which is to be driven across the faces of breasts. Three new boilers have been added.

Sugar Loaf.—A pair of hoisting engines, 18″×30″, have replaced the old single engine at No. 1 slope. Two large Thatcher pumps, size respectively 24½″×12½″×72″, 31½″×15″×72″, one pole pump 18″×84″, and four additional boilers, 33″×30′, have been put in. The bottom lift in this slope is at present full of water, but in about two months time they expect to have it out, when gangways will be started to take out the coal on both dips of the Mammoth.

This company (A. Pardee & Co.) is prepared to make a large increase in its shipments the coming year.

Improvements at Mount Pleasant Collieries, operated by Pardee Sons & Co.

No. 1.—A new plane has been driven two hundred and ten feet in length. The ventilation in this place is not very satisfactory. A new fan is to be put in as soon as possible, which will give the desired ventilation. The coal from this place is taken to No. 2 breaker.

No. 2.—The inside plane was lengthened two hundred and ten feet in the past year, making the total length four hundred and eighty feet. A new boiler-house was also built, and six new boilers 33″×30′ added.

Slope No. 4, at present an inside slope, is being extended to the surface through the rock, which will do away with the inside hoisting engine, and the long haulage to bottom of slope No. 2. Three boilers 33″×30′ have been added.

Slope No. 5 was opened up from east gangway of No. 2, a distance of seven hundred and eight feet, with the intention of extending it down to basin. This is one of the best graded slopes in this district. The slope is intended for a double track when it shall have reached the basin, but at

present will afford only one track, hoisting two or three cars per trip, as may be needed. The hoisting is done by a pair of 18″×36″ engines, with a twelve feet drum, and complete in all its arrangements. This company will make a large increase in their shipments the coming year. Twenty-six tenement houses have been erected, new fences built, &c., furnishing comfortable residences for employés.

Improvements at Hollywood, operated by Calvin Pardee & Co.

No. 1.—A new boiler-house has been built, with six additional boilers 33″×30′.

No. 2.—A new 30″×14″×72″ Thatcher pump, and a twelve inch column pipe from pump to surface have been put in place. An addition to the boiler-house was built, and three new boilers added. The breaker was partially re-built, and a new screen-house, while a large screen five feet diameter, pea coal screen, diameter three feet six inches, and two Clark jigs were added to machinery. A new plane on surface was built, and is operated by a small pair of 12″×12″ engines. This breaker takes the coal from No. 1, No. 2, and the strippings. The improvements made will increase its capacity twenty-five per cent.

Colliery Improvements at the several works of the Lehigh Coal and Navigation Company.

NESQUEHONING.—At shaft No. 1 a tunnel is being driven south from the south dip of the Mammoth seam, by which it is expected to strike the north dip of the same seam in an adjoining basin. The length of the tunnel is expected to be about two hundred and forty yards, from that point it is proposed to extend it to the Red Ash, a distance of . . yards further. About one mile west of slope No. 3 a trial hole was driven to the surface, a distance of two hundred and thirty yards, which is to be enlarged into a slope in the near future. This trial hole is on the north dip of the Mammoth.

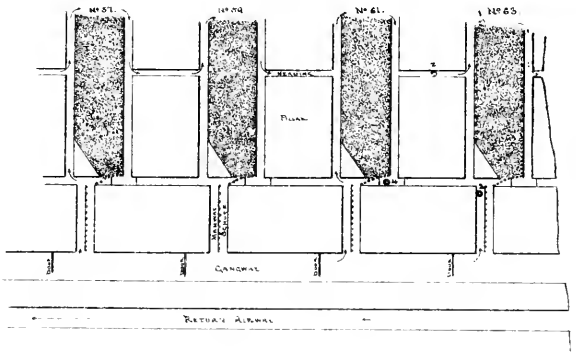
LANSFORD, No. 4.—Six hundred feet of railroad, four feet eight inch guage was built; two boiler-houses and ten boilers 32″×32′ were erected.

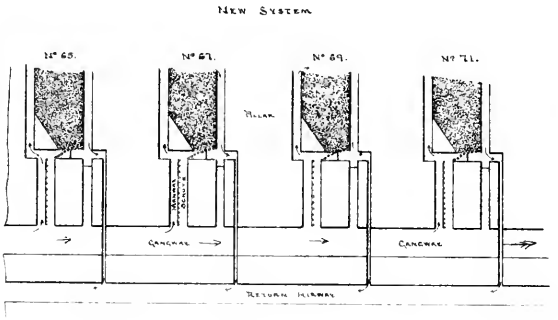
At No. 5, a new Allison & Bannan pump 36″×16″×72″ was put in place.

No. 6.—Two thirty-nine horse power engines have been located for the outcrop workings west of tunnel; two boilers 36″×28′ and suitable buildings have been put up.

No. 9.—At this place two fifty-horse power engines have been located about fifty yards west of inside slope on lower gangway for sinking, and afterward the hoisting of coal. Five blocks of tenement houses have been built, and two and one half miles of water pipes were laid in the Nesquehoning valley to supply the collieries with fresh water.

Annexed is small sketch of part of No. 4 colliery, showing where Daniel J. Davis and John D. Davis came to their deaths by an explosion of CH_4 gas in breast No. 63, and where found after the explosion. Also, the old and the new mode of ventilation introduced short time before the explosion. As





SCALE 80 / 1"

Old and New Systems of Ventilation

at the

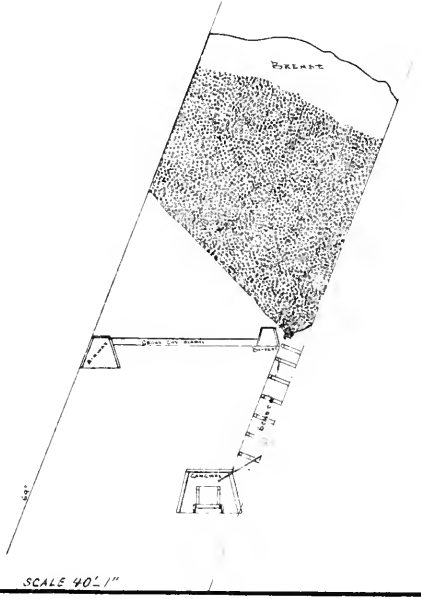
L. C. & N. Co's. No. 4. Colliery,

Lansford, Pa.

1882.

Reference:

1. Where Dan'l J. Davis was at the time of explosion.
2. Where John D Davis " " " "
3. Where Dan'l J. Davis was found after the explosion.
4. Where John D. Davis " " " "



SCALE 40 / 1"

will be seen by sketch, No. 63 was the last breast opened on the old plan. Of the old method of ventilating, I will say nothing here, but claim that the new method has many advantages over it, from which I will cite a few. First, it does away with all the doors on gangways, it gives every breast its own separate split of air, it lessens the friction of the air by shortening its distance to travel, and in any ordinary or local explosion, it will add greatly to the safety of men employed in adjoining breasts. By referring to the sketch, it can be seen at a glance, that had the men been up in breast No. 61 when the gas was exploded in No. 63, that likely they would have met with the same fate as the Davises, as the cross-cut was near face of breast. By the new way there is no connection to be between the breasts, consequently the lives of careful men are not at the mercy of the few reckless ones; therefore, in my opinion, the new way is the best and safest, and in the long run the cheapest.

TABLE NO. 1,

Shows the number of deaths of the different classes of employés inside and outside the mines, and the causes thereof.

CAUSES OF DEATHS INSIDE.	Miners.	Miners' laborers.	Company laborers.	Drivers.	Door boys.	Pumpmen.	Totals.
By falls of coal, slate, and roof,	13	11	...	...	...	...	24
By mine cars,	...	...	5	3	1	1	10
By explosion of CH_4 gas,	2	1	...	...	...	...	3
By premature blast,	1	...	...	...	...	...	1
By machinery,	...	...	...	...	...	1	1
By rupture,	...	1	...	...	...	...	1
By mine prop,	1	...	...	...	...	...	1
Totals inside,	17	13	5	3	1	2	41

CAUSES OF DEATHS OUTSIDE.	Slate pickers.	Drivers.	Laborers.	Totals.	
By machinery,	2	...	1	3	
By mine cars,	...	...	1	1	
By mule,	...	1	...	1	
By falling into old breast,	...	...	1	1	
Totals outside,	2	1	3	6	6
Totals inside and outside,					47

TABLE NO 2,

Shows the number of each class employed, the number of deaths in each class, and the ratio of each class employed, per life lost, inside and outside of mines.

CLASSES OF EMPLOYEES INSIDE OF MINE.	Number of employés.	Number of deaths.	Ratio per life lost.
Total number of miners,	2,903	17	170.76
Total number of miners' laborers,	1,557	13	119.74
Total number of company laborers,	718	5	143.6
Total number of drivers,	605	3	201.66
Total number of door boys,	277	1	277
Total number of pumpmen and engineers,	134	2	67
All other employés,	193		
Total inside,	6,387	41	155.78
Outside of Mines:			
Total number of slate pickers,	2,217	2	1108.5
Total number of drivers,	267	1	267
Total number of laborers,	966	3	322
All other employés,	1,549		
	4,999	6	833.16

The total number of employés inside of the mines was six thousand three hundred and eighty-seven, of which forty-one lost their lives, making the ratio of persons employed per life lost only 155.78, which shows an awful slaughter of human lives. The total number of employés outside of the mines was four thousand nine hundred and ninety-nine, from that number six lives were lost, making the ratio of persons employed per life lost 833.16.

The grand total employed inside and outside the mines, was eleven thousand three hundred and eighty-six;* the total number of lives lost inside and outside was forty-seven, making the total ratio of persons employed per life lost only 242.25.

Table No. 3

Gives the total number of non-fatal accidents, the number of each class of injuries, and the causes thereof.

Causes of Accidents Inside the Mines.	Injuries, but no bones broken.	Legs fractured.	Arms fractured.	Collar bone fractured.	Ribs fractured.	Thigh fractured.	Hip dislocated.	Arm dislocated.	Total.	Total from all causes.
By falls of coal, slate, and roof,	11	9	2	1	1	. .	. .	1	25	
By mine cars,	21	3	3	3	. .	1	1	. .	32	
By premature blasts,	3	1	. .	1	. .	. .	. .	. .	5	
By steam pipe falling,	. . .	1	. .	.	. .	. .	. .	. .	1	
By explosion of CH_4 gas,	11	. .	. .	. .	. .	. .	.	. .	11	
By falling into slope and breast,	2	. .	. .	. .	. .		.	. .	2	
Miscellaneous,	3		. .	. .	. .	. .	. .	. .	3	
	51	14	5	5	1	1	1	1	79	79
Outside of Mines.										
By falling into an abandoned breast,	1	. .	. .	. .	. .	. .	. .	. .	1	
By mine cars,	2	. .	.	. .	. .	. .	. .	. .	2	
By machinery,	1		. .	. .	. .	. .	. .	. .	1	
By falling from breaker,	. . .	1		. .	. .	. .	. .	. .	1	
By falling in breaker,	. . .	. .	3	. .	. .		. .	. .	3	
By falling into breaker screen,	. . .	. .	. .		. .	1	.	. .	1	
	4	1	3	. .	. .	1	. .	. .	9	9
										88

Deaths from Falls of Coal and Roof.

From year to year the number of accidents from falls of coal, slate, or rock, are large in number and in fatality; indeed, the greatest number of accidents in this Lehigh region are due to these causes. To the careful student of inspectors' yearly reports the figures are startling, which detail

* Have added to table No. 2, two hundred and eighty-six men employed at different work around the different collieries which, as will be seen, are not counted in table No. 4 as producers of coal.

the slaughter of men by this agency of destruction; and the inquiry naturally comes, can nothing be done to prevent this drain on our working classes, and to remove, to some extent, this menace to the miner's life and limb? There is but one effectual remedy in my mind, and that is more competent and stricter supervision on the part of mine bosses, with larger experience, better knowledge, and greater caution in mining by employés themselves. In no field of labor, possibly, is there so much ignorance, so great a lack of knowledge, or familiarity with what is required, than is shown in the management and operation of mines. And in no avocation is there so much need of education, is experience so necessary, or caution more imperatively required. From the time the first shovelful of earth is removed from a mine opening the pathway of employés is studded with danger, and not a forward step is taken, not a blast is fired, not a timber erected, not an act of any kind performed within the wide scope of a miner's vocation that danger does not increase, that new perils do not spring into existence, and threaten to destroy those who toil amid the bowels of the earth. And, yet, to meet these dangers, to grapple with these perils, we see too often men employed who are the least fitted for the task in every respect. Too many men have charge of mines whose highest thought is to gain commendation from their superiors by large shipments of coal and great progress in the mines, and who, in the prosecution of this end, subordinate every other interest, neglecting to advise or to compel the taking of such precautions as would reduce to a minimum the dangers that now swell the list of dead and maimed miners. And among employés things are even worse. Men who have scarcely ever seen the interior of a mine, youths who for a time have driven a mule, tended a door, or loaded a coal car, suddenly develop into miners, and are granted the privilege of cutting coal at the risk of their own and the lives of their subordinates, and frequently to the detriment even of mines. While in almost every other occupation in life knowledge and proficiency are pre-requisites to employment, they receive little or no consideration in the selection of those who cut or mine coal. And until this evil is corrected we shall continue to have numerous accidents in mines; until superintendents and their deputies are appointed only on grounds of merit in learning—practical as well as theoretical, and will perform their duties without fear or favor, and miners are employed because of their known ability and experience in mining, and a strict attention to the safeguards their dangerous work calls for, we shall have no diminution in the yearly slaughter that inspectors are called to record.

*No. 20.—Hugh Burns, miner, aged forty, was killed by a fall of coal in the Mammoth seam, Oak Dale, No. 1, July 29, at 7.30, A. M. Deceased had fired a blast the day previous as he was going home. He knew at the time that the benches above were heavy, and expected that all hanging coal would fall during the night. Next morning as he was going up to the face

*This was the first death occurring after I was commissioned, therefore can give no detailed account of the other accidents.

of his breast and, as every miner should do, examining his place, he sounded some top coal, and while so doing a bench about eighteen inches thick fell the whole width of breast, striking and killing him instantly. His body was found close to pillar.

No. 21.—Albert Thomas, laborer, aged twenty-eight, was killed by a fall of clod, at Yorktown, August 2. The deceased was working with a man named Jones, opening a breast in the Wharton seam. The place was about ten feet wide, and driven twenty feet from platform props. This seam at this place has a clod on top ranging from six to twelve inches thick and very treacherous. The mine boss had been in the evening before, and told the men to take the clod down, as it was getting heavy near the platform. They said they would do it next morning. In accordance with this promise, they tried but failed for the time being, and resumed work in the face of the breast till noon. After dinner they made another effort to remove the clod; deceased was sent by the miner for a stout bar, and while returning over the platform, the piece fell, covering both men, killing Thomas instantly, and severely injuring Jones. Size of piece was 10′×4′×6″.

No. 23.—Condy Conner, miner, aged forty, was killed by a fall of coal in the Wharton seam at Tresckow, No. 2, August 11. A few minutes previous to accident, the mine boss was with deceased, and at that time everything appeared safe. The miner had prepared and fired a blast, and it is thought went right back and commenced to bar down coal when, as is often the case, another piece fell with the results stated. The seam here is only nine feet high. The piece that killed him weighed about two hundred pounds, and only dropped about five feet.

No. 24.—Casper Brust, miner, aged fifty-four, was fatally injured by a fall of benches in the Mammoth seam at Cranberry, August 24, and died the same evening. At this place the seam is thick and full of slips. The deceased and his son were working together. They had just fired a blast in top coal, and went back too soon, before the loose coal had time to fall. The deceased was on one side of breast, and his son on the other; before they commenced to do anything, the son called to his father to move back as the top coal was working; ere he could do so, however, the coal fell, and striking him, broke his thigh in two places, and inflicted other injuries from which he subsequently died.

No. 26.—Frank Comisky, laborer, aged thirty-one, was killed in B seam by a fall of top coal at Eckley, No. 5, September 5. The deceased was loading a car, when the piece fell, striking him on the head and crushing his skull. This case was purely accidental. It was caused by a slip coming in with side and crossing at right angle with face of breast, which was not seen until the coal fell. The top coal was undermined for about seven feet. When this seam is as strong as in this place, they usually undermine it fifteen or twenty feet, but in doing this, the top should be carefully watched.

No. 28.—William McLaughlin, laborer, aged thirty, was killed October

14, by a fall from the first bench in the Mammoth seam, at the face of gangway, in inside slope, Hazleton mine. Deceased was one of two laborers working for William Kelly, making a double siding at the foot of said slope. In my investigation I found this place carefully worked, timbers kept well to face and properly lagged. They generally put three feet between each sett of timber, and at this time they were making a place for a set. From the last sett to face the distance was nearly six feet. The miner was on the right hand side, quite close to deceased, drilling a hole to get the piece down. The miner had just previously sounded the piece, and concluded that they could not get it down without a blast. The piece measured 6′ 3″×2′ 6″×20″.

No. 30.—David Thomas, miner, aged fifty, was fatally injured (dying the same evening) October 20, by a fall of top coal in B seam, at Upper Lehigh, No. 4. The deceased was widening the bottom of slope to make room for a sump, and had a blast ready to fire. At the time of accident he was helping his laborer to fill the car, so it could be taken out before blasting. This was a very wet place, so wet, indeed, that a man could not examine it carefully. If he could have done so, he might have detected a slip coming in with the pillar, which, with the water coming through, caused the coal to fall. Deceased was considered one of the most careful miners in this region.

No. 35.—James McGarvey, laborer, aged twenty-four, was killed by a fall of slate in B seam, No. 1, Cross Creek, October 27. This was an accident that could have been avoided, as the piece that fell must have been hanging for at least a week, the miner informing me that he had tried to take it down several times and failed. The mine boss testified that he told the miner several times to take the piece down a few days before the accident occurred, and that he was in that place about fifteen minutes before noon the day of accident, when he called the miner's attention to it again, and told him to take it down at once. The miner wanted to prop it up. To this the mine boss objected, saying that the piece had to be taken down. The miner promised to do so as soon as the car was taken out of the way. This he either forgot or neglected to do, for at two o'clock, while the laborer was loading another car, the piece fell, killing him instantly. The miner admitted the truth of the statement given above, except that the boss gave him any orders on the day of accident to take the piece down, which he denied. It is impossible to ascertain which of the parties tells the truth, as the only witness to their discourse is beyond reach. But whether he was told that day or not to take it down, he should have done so, as he knew that the piece was unsafe to work under, and when the boss told him the first time to do it, it was the boss's duty to see that it was done at once; in so far, both are censurable.

No. 36.—Enoch Smith, miner, aged fifty-one, was killed by a fall of coal in B seam, Highland No. 2, November 3. Deceased, with his son, was opening breasts in the west gangway. The coal, though generally hard

and strong in this mine, is soft and full of slips on this side. They had fired a blast some twenty minutes before, and waited a reasonable time for the smoke to clear away, as they had no cross-cut driven. The son testified that as far as they could see there was no coal hanging; said that his father was a very careful man, and had sounded every place with his drill, and both were satisfied that everything was all right. The son had to go to the gangway, which was only a few feet off, for some oil, and just as he reached the box he heard a fall, and immediately called to his father; receiving no answer he rushed up to the face and found him lying dead. This is a very peculiar case. The piece that fell weighed about a ton. There was no bones broken, no cuts, or bruise given, only a little blue spot on the side of the neck. The inside boss promised to have a doctor examine him, and find out the immediate cause of his death, but it does not appear to have been done.

No. 38.—Julian Krumm, miner, aged forty-eight, was killed November 16, by a fall of top coal, in the Mammoth seam, at East Sugar Loaf. The deceased was engaged in taking out pillars, a dangerous task in such a high seam as this. The coal is full of slips, which cross in every direction, and to add to the danger, the place is very wet. It has pitch enough to carry the coal down to the car, and, with careful management, this coal could have been taken out without any great risk. The miner is not required to fire many blasts, and, with good judgment, he can always put them so as to bring down the coal without exposing himself. But this day this man did not have enough coal to load his car before firing a blast. Therefore he asked the laborer to go up among some loose rock to throw a few lumps of coal down. The laborer sensibly refused, when the miner went up himself, and while throwing the coal down, the top fell and killed him.

No. 42.—John Lehr, laborer, aged thirty, was killed December 1, by a fall of slate at face of west gangway, in B seam, at West Cross Creek. The gangway at this point was in a fault; all of the coal had been squeezed out, and it was nothing less than a piece of tunnel, with a leader of coal about a couple of inches thick on the bottom. This gangway had been all timbered to within six feet of the face. John Lloyd, mine boss, had been in the face of the gangway that morning and ordered it to be squared up, and another set of timbers put in; not because he thought the place dangerous, but that he wished to have all the work uniform. John Hoffman, miner in charge, said that they had fired a blast, and remained out about fifteen minutes to give the smoke time to clear away; then he went in and sounded the roof, and considering everything safe, called the laborers in to load the car. This the laborers commenced to do, and in a few minutes the slate fell, striking the deceased on the head, crushing his skull. The piece that killed this man was in the shape of a hemisphere. Its width on straight side was four feet; length, five feet; over the curve, six feet; thickness in center, two feet ten inches, and tapered out both ways to nothing. I consider this case purely accidental, as neither the miner in charge or the

mine boss could detect any parting in the top until the piece fell. It should impress on all concerned that they cannot be too careful.

No. 43.—Frederick Meiss, miner, aged twenty-six, was injured by a piece of the dividing slate in the Mammoth seam, at East Crystal Ridge, December 18, and died the same evening. Deceased and another young man were working this breast together. The breast at this point was eight yards wide. They had undermined what they call the four-foot slate, for a distance of nine feet. The slate in some of these places is very hard to get down, and, to avoid much blasting, it is usually undermined from nine to twelve feet; but in doing that it needs careful watching to detect any slips and cross slips. On examining this place I found two slips in this slate when it fell, running at right angles with each other, which explains the sudden falling of this piece. Deceased was shoveling the coal from under the slate, while his partner was preparing to put a hole in above it, as he had sounded it, and decided that they could not get it down without a blast. Suddenly the piece fell, crushing Meiss beneath it. Size of piece 6′×7′×17″, which is the thickness of the slate at this special point. The duty of mine bosses, in all places, is to examine carefully the condition of all coal, slate, and rock overhead, and they should see that all doubtful pieces are taken down. A large number of accidents might be avoided if this matter was more carefully attended to, for in all mines there is a large percentage of men who need constant watching.

No. 44.—George Eclick, laborer, aged thirty-three, was killed by a fall of clod in the Wharton seam, at Humboldt No. 2, December 10. Deceased was one of two laborers in a breast working with one George J. Michael. The breast was only nineteen feet wide, but had a bad roof, being near the surface. It had one row of props in. Where the clod fell there were only four feet from the clod to bench of coal. There was a parting running up through the coal and extending into the roof, which accounted, in some degree, for its sudden fall without warning. The miner testified that he had not noticed the parting, and that it could not have been seen until the piece fell. He should, however, have taken greater precautions, as he knew that his laborers were quite ignorant of any danger. I notified the mine boss that this breast had to be double-timbered or stopped, as the roof is too weak to be held up with props.

No. 46.—Martin Boasick, laborer, aged thirty-three, was killed by a fall of coal in the east gangway at Highland, No. 1, inside slope, B seam, December 29. Deceased was one of four laborers working in said gangway, which is timbered in some places, and at others is considered safe enough without timbers. The mine boss ordered the miners to put in four sets of timbers, about ten yards from face, as the coal was getting heavy. The day of the accident the two miners and four laborers came out on the morning shift. Some of them were blasting, others were loading, and the others were making room for the first set of timbers. In this way they had intended to make room for the four sets of timbers at once, and in

trying to do so, they sadly erred. If the men had kept working, three on each shift as usual, they could have put the timbers in place without any great risk, as the coal is hard and strong, but when they commenced to blast the sides, thus taking out the natural supports, they made the place extremely dangerous. This morning they had all been very busy at work, not thinking much of anything except to put up the required timbers in the least possible time. They must, however, have had some misgivings on the matter, as both admitted that they had examined the coal and decided not to blast any more until the first set was in, and told the laborers to load the loose coal so that they could get the timber car in. The four men commenced to load, but before the car was one third loaded, the coal fell, breaking the car, and instantly killing one man, while two others had a very narrow escape. During the investigation the miners acknowledged to me, that their reason for coming out together was, that they could put in the timbers much easier by making room for three or four sets at once; and again, that they did not think they were incurring any risk by doing so. The inside bosses should see that their men take all due precautions. The mine boss in this case was not aware that the six men were out until the accident occurred, as he had not visited that part of the mine that morning.

No. 47.—Edward Mayer, miner, aged twenty-seven, was killed by a fall of benches at No. 6 Hazleton, in Mammoth seam, December 29. Deceased and a young man named William Dince were opening a breast about ten feet wide, the face of which was about fifteen feet from gangway. The mine boss was in their place that morning, and told them to take the benches down, as they were heavy, which they promised to do. He passed there again before noon, and found Dince trying to take the benches down, and when he reached the foot of slope he found Mayer sitting down, and told him to go in and assist his partner, and afterward to put in their chute props. Mayer started in, and about the same time a trip of empty cars was taken in, and one car was left at this place, which deceased commenced to load. His partner sat down on one side until the car was loaded. Before this was completed, however, the piece fell and struck Mayer on the head, crushing it fearfully. Dince testified that deceased would not let him take the piece down until he had the car loaded. The miners working in adjoining chambers testified that they had repeatedly warned these two men of their danger. The last time they were warned, deceased answered: "We will take it down as soon as the car is loaded." The mine boss in this instance should have stopped their cars in the morning until the place was made safe; then they would, in all likelihood, have taken the piece down, and the danger have been averted. In conclusion, I must say that these men were either ignorant of the dangers attendant on coal mining, or else reckless in the extreme.

By Mine Cars.

Cars have always been a great source of danger to mine operatives, and

will continue to be so to some extent; but with proper care and attention from all concerned, the number of accidents could be greatly reduced. The danger is increased in this district by the irregularities of the coal seams in these shallow basins. The Buck Mountain and Wharton seams are generally mined by a series of runs, and counter gangways, as they are neither flat enough to run cars into, or have pitch enough to carry the coal on sheets, thus making it very laborious and dangerous work to take coal down to the main gangways. Here and there they have introduced planes, with very good results, but the majority of places cannot do this, as they would be cut off by different anticlinals. Hence, it is that the coal must be taken down by the gravity roads by "runners," as they are termed. Under the most favorable circumstances, and with the utmost care on the part of all concerned, transporting cars on these "runs," is a very dangerous occupation, and to partly counteract this, the inside boss should enforce the most rigid discipline among drivers, runners, and door boys. No driver or laborer should ever be allowed to run cars, and no door boy should be permitted to drive the mules; as in doing work they are not accustomed to, they are running extra risks, and often have to pay a severe penalty. In some mines in this district, brakes are used on cars instead of sprags, which is a much safer plan; with a good brake the runner can ride behind his car or trip, and if, by any accident to brakes, they get beyond his control, he can jump down and let them go, thus escaping injury. But in using sprags he has particular places to put them in, and particular places to take them out, causing him to be on a continual run to catch up here and there for the purposes named. The great danger, however, occurs when some of the sprags fall out, and the trip commences to run "wild;" then the runner in the excitement of the moment, and at the peril of his life, makes a dash past the cars, so as to reach some convenient point where he expects to be able to throw in more sprags, and to get his trip under control again; often in doing this he falls, the cars pass over him, and another unfortunate is added to the list of "killed by mine cars." If coal companies are forced by circumstances to bring their coal down to the main gangways in this way, they should have several runners for each run, and have them stationed at proper places so they could sprag the cars while passing; under no circumstances should the boys be allowed to run with cars. I would add here that the safety of drivers and runners depends, to a great extent, on the mine bosses. They should see that roads and sides of roads are kept free from all refuse, and that the miners do not pile it up on the sides of gangways opposite their breasts, as many a driver boy has lost his life by being tripped in such places, and the cars running over him. Drivers and runners should never take unnecessary risks with cars. Any boy doing so should be discharged.

No. 27.—Thomas McCabe, a driver, aged fourteen, was fatally injured at Room Run, September 9. The deceased was employed to drive on the slate bank, and while taking out a trip of cars, riding in front, he discovered that

the latches were turned wrong; he jumped down to correct them, and in doing so fell, was caught by the cars and injured so severely, that he died the same evening.

No. 29.—William Elliot, a dumper, aged twenty-three, was fatally injured at Hollywood breaker, October 8, being caught between a car and the gate on the breaker trestling. He had dumped a car of slate into the slate chute, twenty feet below the coal chute, and while partly in the chute loosening a piece of slate that had been jammed, he was caught by the car and squeezed against the iron gate. There are, in the engine-house at this place, two engineers, one hoisting coal from bottom of slope No. 1, and the other hoisting from foot of said trestling the coal that comes from slope No. 2, and from the stripping. They were signaled by different raps on the same rapper, which caused the mistake. Mike Younkle, an Italian boy seventeen years old, said his duty was to take off the tickets from the cars, and give the necessary signals to the engineers; said he had never made any mistakes in his signals. He explained, that two raps start No. 1, and that three raps start No. 2, and was very positive that he gave the correct raps this time. The engineer said that he generally understood the signals, but sometimes they were indistinct; I am inclined to the belief that the engineer made this mistake, as he was not positive in his assertions. The engineer is a man of twenty-five years' experience, and considered trustworthy. They had been running one year with only one signal (or rapper) for two engineers, which was very wrong. Every engineer should have a separate signal, and that put close enough to him so mistakes might be avoided. I ordered separate signals arranged, which order was complied with forthwith.

No. 31.—George Bruce, door tender, aged twelve, was injured at Mount Pleasant, No. 2, October 29, and died the same evening. He was hired to tend a door near foot of run; all drivers had to keep their cars under control, and have them stopped unless he gave them the signal to come on. A few minutes before the accident occurred he was eating a lunch, when a party outside called "all right," he got up and opened his door, and went to meet the driver, after giving him the signal. The driver came on, and while passing, met deceased about thirty feet inside of door. While walking back by side of cars, the little fellow fell, and was dragged by the cars over to the door, where they went over him, mangling him fearfully. He spoke sensibly to the last, saying that his uncle, the mine boss, had given him positive instructions not to go away from his door. Probably if he had obeyed instructions, he would be alive to-day.

No. 34.—Charles Tyson, a footman, aged twenty-two, was fatally injured by mine cars at Oak Dale, No. 2, October 14, and died on the twenty-seventh of same month. He was at his work at bottom of said slope, standing in front of a loaded car, when the empty car came down on the wrong track through a misplaced switch. He was knocked down and had his head jammed between the cars. There are a pair of spring latches near the bot-

tom of said slope, and it is supposed that a piece of coal got between them and rails. In so far as the misplacement of the latches was concerned, this accident might not have been prevented; yet had the deceased instead of standing before the car been in the place prepared for footmen, his life might not have been lost.

No. 37.—Daniel Price, slate picker, aged eleven, was killed November 6, at No. 4 breaker, Lansford. The boy was engaged at shoveling slate in said breaker at this time; and the pockets becoming full, he took it on himself to go and tell the loader to empty it. When the ltttle fellow was next seen he was under the cars dead. Nobody saw him falling, but it is supposed that he started to cross the track on a plank standing above the road about eight feet, and that he fell, being either killed by the fall, or was unable to get out of the way of the cars. At the inquest it was found that boys are not allowed to go on any errands at this breaker. Their work is to pick slate, and shovel it into pockets. The jury, at the inquest, found that "deceased came to his death by being run over by mine cars at a place he had no business whatever to be at." The screen bosses should see that these little fellows are properly cared for, and not allowed to roam around different parts of the breakers. The screen-rooms are the only places where they should be allowed to go to.

No. 40.—John Younkle, a pump boy, aged eighteen, was found in a dying condition near foot of Laurel Hill slope, November 26. He was hired to run the pump, but it seems that it was not enough work for him to keep him out of mischief. It is not positively known how this boy came to his death, as nobody saw the accident. It is supposed that he jumped on a loaded trip and fell between the cars in some manner. It is the duty of mine bosses to send these boys home if they cannot be made to stay at their own work. Certainly parents would much rather have them discharged than sent home on stretchers.

No. 45.—Neal O'Donnell, a dumper, aged thirteen, was injured at No. 2 breaker, Cross Creek, December 17, and died the same evening. No person saw this accident, but it is presumed that he was caught by the car while taking off the ticket before it reached the dump. He was terribly mangled, his thigh bone being fractured, the knee joint crushed, muscles of leg lacerated, and other injuries sustained around body. He was unable to give any account of the accident, and, as no other person was near at the time, we have only to guess at it, feeling certain, however, that he was killed by mine cars.

Explosion of CH4 Gas.

Nos. 32 and 33.—Daniel J. Davis and John D. Davis, miners, aged respectively twenty-eight and thirty, were fatally burned by an explosion of fire damp in the Mammoth seam, No. 4, Lansford, October 27. The first named died the same evening. John D. Davis died after great suffering November 16. The particulars in this case are as follows: These two men worked together in breast No. 63, on west side of said slope. The coal in

this and adjoining breasts is sixty feet thick, and has an angle of 73°. The coal in all these chambers is very free, in No. 63 especially so. All of these chambers generate large quantities of fire damp. On account of the free coal and the large amount of gas, they were worked with safety lamps. Their mode of ventilating here is by carrying a manway on each side of breast, so the air can go up one side and come down the other. But on account of steep pitch and free coal, their manways are not as large as desirable, but I must admit that they cannot be made much larger with safety to the men traveling up and down. The ventilation in this mine is the best in this district; when I measured, I found thirty-five thousand cubic feet of air per minute traveling near the face of said west gangway, and equally as much on the east side. Owing to existing circumstances here, the managers had given orders, sometime before the explosion, that all miners in breasts had to work with safety lamps exclusively. But from all the testimony I heard at my investigation of the accident, it seems that deceased men had repeatedly violated the orders, though unknown to any of the mine officials. The same fact was developed at the coroner's inquest, as to the cause of John D. Davis' death. During my investigation, a witness named James Dale testified, under oath, that he "saw Daniel J. Davis using a naked light," and that he spoke to him about it. Before the coroner, John T. Welding testified that Daniel J. Davis and he worked in the manways of said breast with naked lights a few days before the explosion. But John D. Davis, one of the burned men, gave me the most decisive testimony on the Monday following the explosion. He said that they were putting in a length of manway that morning, and were doing it with the lights of their safety lamps; that he went down for some slabs, and when he came back Dan J. Davis was working with a naked light, and when he reprimanded him for it, (at the same time informing him that he had been burned twice, and that he should take every precaution to avoid being burned again,) Dan answered: "You seem to be greatly afraid." He (John) went down again for more slabs, and when in the cross-cut getting them, the gas exploded, burning both men severely, and blowing them down the manway. Davis also stated that there was no gas in their place that morning as far as they could reach, as he saw Dan examining it, but that they could not go back to the top, as it was too dangerous on account of coal falling. The finding of the jury in John D. Davis' case was: "That the deceased, John D. Davis, came to his death by an explosion of gas, ignited by a naked light, in the hands of D. J. Davis; said D. J. Davis using a naked light, contrary to strict orders of mine officials."

There have been improvements made in ventilating this mine, which will insure greater safety to men employed. These improvements are described in the proper place in this report.

Premature Blasts.

No. 22.—Martin Dominsky, miner, aged forty-two, was injured August 5, in B seam, at Sandy Run, and died while being taken home. Deceased

had gone to the mines very early this day to get coal ready by seven o'clock. He had fired one blast, and was firing another when he met his death. He had tried the latter blast once before, and had gone back to fire it again, and was but a few feet away when the blast went off, with the result stated. I must say here that I believe the mine bosses should be censured for giving places to mine to such men as the above. By the appearance of deceased's breast he was more fit to dig clay than mine coal; and I am sorry to say that we have a large number of such men mining in this district, and the same may be said of every other district in the anthracite coal region. No man should be hired for such dangerous business without the required qualifications. The more intelligent our miners are the less accidents we have to record.

Miscellaneous Inside.

No. 41.—William Fishburn, miner, aged fifty-three, was injured November 29, in the Wharton seam, No. 5 slope, Mount Pleasant, and died the following night. Deceased was foreman of a gang of men engaged in retimbering old chambers through which No. 5 slope had been opened. He had charge of this work from commencement of said slope, and should have known how to do it with safety to himself and the men under his charge. In the breast, where the accident occurred, they had put in four new props, which were of good size; then they had to take out three old ones, which were too near the road. One was taken out successfully, and deceased was taking out the second, when the loose slate on the upper side slid down; and it appears that it struck the props sidewise, and knocked out the four new ones. One of these props caught him when he was jumping back, and knocked him down on the rails, breaking his back, and otherwise injuring him. These new props could not have been properly fastened, else they could not have been displaced by such a small rush of slate. One of them properly fastened would have been able to stand the whole shock. The inside boss, Robert Fishburn, a brother of the deceased, had told him a few days before, that he should be careful to brace his new props before he took out the old ones; but it seems that he paid no attention to the orders. The deceased had worked in the mines from boyhood, and was considered one of the most competent miners employed by the company.

Miscellaneous Outside.

No. 25.—Andrew Robsach, aged twenty, an outside laborer at the Hollywood stripping, was killed, September 3, by falling into an abandoned breast. Deceased, with other laborers, was engaged in clearing away the loose ground from the outcrop of the Mammoth, when suddenly a large piece slid away under his feet, carrying him along a distance of fifty feet. It had been raining for a few days, making the ground loose and soft. Knowing that fact, there should have been more care taken.

No. 39.—Patrick Sharp, slate picker, aged twelve, was found dead at the mouth of one of the coal screens in the Hauto screen building, November

25. He was engaged this day as usual at picking slate, and his absence was not discovered until his body was found by the boy who oils the machinery. It appears that the boy wanted to go out of the building unseen by the boss, and for that purpose he undertook to go out through a very dangerous way. There is no kind of traveling way in that direction, but there happens to be a gas pipe crossing above the screen, and he risked and lost his life by trying to slide down said pipe. Under said pipe there are two chutes leading into screen, and he must have fallen into one of them before he could reach the place where he was found. The boy must have been drowned before he ever reached the screen, as there are two large streams of water running into the chutes, and from the point where both connect to the mouth of the screen, a distance of eight feet, it is closed, so that the water is confined to take the coal into screen, and through this water he must have passed. This is an accident that no person could provide against. I examined the building, and found it as safe as such buildings can be made. These little fellows will climb over almost anything when they want to avoid the eye of the boss. The coroner's jury rendered a verdict of "accidental death."

TABLE No. 1.—*A list of accidents resulting in death in the South District of Lu-*
the year ending

Date.	Number of accident.	Names of Persons Killed.	Occupation.	Age.	Widows.	Orphans.	Names of Collieries.
Jan. 7	1	Michael Barricks,	Laborer,	23			Mount Pleasant,
18	2	Michael Dowling,	Miner,				Cranberry,
19	3	Charles Dime,	Footman,	25	1	1	Council Ridge,
19	4	Manus Cannon,	Miner,	40	1	3	East Sugar Loaf,
25	5	John Jones,	Laborer,	19			Treskow,
26	6	Miles Frey,	Pumpman,	42	1	4	Oak Dale,
Feb. 26	7	James McConnell,	Roadman,				Room Run,
April 8	8	James Neasy,	Miner,	35	1	1	Milnesville,
20	9	Dennis McGuire,	Slate picker,	13			Sugar Loaf,
25	10	Will, (Polander,)	Laborer,				East Crystal Ridge,
26	11	Neal Boyle,	Miner,	25			Harleigh,
May 14	12	Frank Boyle,	Driver,	16			Ebervale,
16	13	Patrick Duffy,	Laborer,	23			East Sugar Loaf,
25	14	Lennest Anthony,	do.				Laurel Hill,
27	15	Frank Boyle,	do.	40			Cross Creek,
27	16	Gowen Gifford,	do.				Spring Mountain,
June 11	17	Septimus Jones,	Miner,	40			Cross Creek,
July 8	18	Andrew Peter,	Laborer,	27			Ebervale,
13	19	Charles Sweeny,	Driver,	15			Yorktown,
29	20	Hugh Burns,	Miner,	40	1	4	Oak Dale,
Aug. 2	21	Albert Thomas,	Laborer,	28	1	3	Yorktown,
5	22	Martin Dominsky,	Miner,	42	1	4	Sandy Run,
11	23	Condy Conner,	do.	40	1	4	Treskow,
24	24	Casper Brush,	do.	54	1	6	Cranberry,
Sept. 3	25	Andrew Robsach,	Laborer,	20			Hollywood,
5	26	Frank Comisky,	do.	31	1	5	Eckley,
9	27	Thomas McCabe,	Driver,	14			Room Run,
Oct. 14	28	William McLoughlin,	Laborer,	30	1	1	Hazleton Mine,
20	29	George Bruce,	Door boy,	13			Mount Pleasant,
20	30	David Thomas,	Miner,	50	1	5	Upper Lehigh,
26	31	William Elliot,	Laborer,	23			Hollywood Breaker,
26	32	Daniel J. Davis,	Miner,	28	1	5	Lansford, No. 4,
26	33	John D. Davis,	do.	30	1	6	do.
27	34	Charles Tyson,	Footman,	22			Oak Dale,
27	35	James McGarvey,	Laborer,	24			Cross Creek,
Nov. 3	36	Enoch Smith,	Miner,	57	1	3	Highland,
6	37	Daniel Price,	Slate picker,	13			Lansford, No. 4,
16	38	Julian Krumm,	Miner,	48	1	3	East Sugar Loaf,
26	39	Patrick Sharp,	Slate picker,	10			Hauto Screen Building,
26	40	John Younkle,	Pump boy,	18			Laurel Hill,
29	41	William Fishburn,	Miner,	53	1	1	Mount Pleasant,
Dec. 1	42	William Lehr,	Laborer,	30		1	West Cross Creek,
8	43	Frederick Meiss,	Miner,	26			East Crystal Ridge,
10	44	George Eelick,	Laborer,	33			Humboldt,
17	45	Neal O'Donnell,	Dump boy,	13			Drifton,
29	46	Martin Boasick,	Laborer,	33			Highland,
29	47	Edward Mayer,	Miner,	27			Hazleton, No. 6,
					17	60	

Killed, ... 25
Fatally injured, ... 22
47

zerne and Carbon counties, Pennsylvania, with remarks on the cause of each, for December 31, 1881.

Remarks on the Causes of Accidents.	Explosion of CH_4 gas.	Falling of roof and coal.	By mine cars.	Premature blasts.	Miscellaneous, underground.	On surface.	Total.	Number of accident.
Fatally injured by a fall of roof; died in five days,		1					1	1
Fatally injured by a fall of coal; died in four days,		1					1	2
Killed by a runaway car on slope, caused by broken link,			1				1	3
Killed by a fall of top coal,		1					1	4
Killed by a fall of roof,		1					1	5
Fatally injured; caught between cross-head and cylinder-head of pump,					1		1	6
Killed by being run over by locomotive on surface,						1	1	7
Fatally injured by battery giving away, being crushed by the coal,		1					1	8
Fatally injured; caught in a screen,						1	1	9
Strained himself by lifting a lump of coal; died in two days,					1		1	10
Killed by a fall of rock,		1					1	11
Fatally injured by falling off mule and getting entangled in harness, &c.,						1	1	12
Fatally injured by an explosion of fire-damp,	1						1	13
Killed by a fall of top coal,		1					1	14
Injured fatally by a fall of top coal; died next day,		1					1	15
Fatally injured by falling under mine cars,			1				1	16
Killed by a fall of coal in gangway,		1					1	17
Instantly killed by a runaway car on slope, caused by breaking of rope,			1				1	18
Killed by a prop falling on him, caused by car jumping off track,			1				1	19
Killed by a fall of top coal,		1					1	20
Killed by a fall of clod,		1					1	21
Fatally injured by premature blast,				1			1	22
Killed by a fall of coal,		1					1	23
Killed by a fall of top coal,		1					1	24
Fatally injured by falling into an abandoned breast from surface,						1	1	25
Instantly killed by a fall of top coal,		1					1	26
Fatally injured; fell under mine car, and died next day,			1				1	27
Killed by a fall of coal in gangway,		1					1	28
Fatally injured by falling under a trip of cars; died the same evening,			1				1	29
Fatally injured by a fall of coal,		1					1	30
Injured fatally; caught between car and gate on trestling,			1				1	31
These two men were fatally burnt by an explosion of fire-damp; Daniel J. Davis died same evening; John J. Davis died Nov. 16,	1						1	32
	1						1	33
Fatally injured by mine cars; died on the 14th of the following month,			1				1	34
Instantly killed by fall of slate,		1					1	35
Killed by a fall of coal,		1					1	36
Killed by falling under mine cars near breaker,			1				1	37
Instantly killed by a fall of top coal,		1					1	38
Found dead at the mouth of a counter-screen,						1	1	39
Found fatally injured on branch near slope; died while being taken home,			1				1	40
Fatally injured by a prop; died the same evening,					1		1	41
Instantly killed by a fall of slate near face of gangway,		1					1	42
Killed by a fall of dividing slate,		1					1	43
Was instantly killed by a fall of clod,		1					1	44
Fatally injured by falling under mine car,			1				1	45
Killed by a fall of coal in gangway,		1					1	46
Instantly killed by a fall of coal,		1					1	47
	3	24	11	1	3	5	47	

RECAPITULATION.

	1881.	1880.
Explosion of carbureted hydrogen gas,	3	
Falls of coal and roof,	24	12
By mine cars,	11	6
Premature blast,	1	2
Miscellaneous, underground,	3	3
Miscellaneous, on surface,	5	3
	47	26

TABLE No. 5.—*A list of serious, but non-fatal, accidents in the South District of the year ending*

Date.	Number of accident.	NAMES OF PERSONS INJURED.	Names of Collieries.
Jan. 3	1	Joseph Newton,	Sugar Loaf,
3	2	John Glynn,	Hazleton, No. 6,
7	3	John Pupco,	Mount Pleasant,
9	4	Morgan Davis,	West Cross Creek,
12	5	Patrick McGinley,	Spring Mountain, No. 5,
17	6	Owen R. Evans,	Treskow, No. 6,
17	7	Adam Peuser,	do. do.
17	8	A. J. Shares,	Cross Creek, No. 1,
17	9	Peter Carr,	do. do.
17	10	D. S. Higgins,	do. do.
25	11	Michal Ulca,	East Sugar Loaf,
28	12	Franklin Saunders,	Room Run,
31	13	Franklin Westfield,	Middle Cross Creek,
Feb. 7	14	Joseph R. Roberts,	Coleraine, No. 2,
7	15	Peter Sweeney,	Eckley, No. 5,
11	16	James McGee,	Sugar Loaf,
14	17	John Schiedy,	Upper Lehigh, No. 4,
17	18	John Brogan,	Cross Creek, No. 3,
17	19	John Bicks,	Cross Creek, No. 2,
18	20	Patrick Judge,	Humboldt,
18	21	John Jones,	Panther Creek, No. 9,
21	22	Alexander Gibson,	do. do.
March 8	23	Adam Larrich,	East Sugar Loaf,
9	24	John McGehan,	Ebervale, No. 3,
12	25	Hugh Bower,	Cranberry,
15	26	John Gallagher,	Highland, No. 2,
17	27	Fred Snyder,	Cranberry,
18	28	William Drusher,	Upper Lehigh, No. 2,
21	29	John Bogle, mine boss,	Panther Creek, No. 5,
21	30	John Fawkes,	do. do.
21	31	James Evans,	do. do.
21	32	James O'Donnell,	do. do.
22	33	John Barret,	Ebervale, No. 2,
23	34	Neal O'Donnell,	Yorktown,
23	35	Isaac Whitehead,	Room Run,
25	36	Daniel Butler,	Room Run,
April 12	37	Hugh Densmore,	Sugar Loaf,
19	38	John Kenny,	Hazleton, No. 3,
26	39	Hugh McGeehan,	Upper Lehigh, No. 2,
29	40	William Davis,	Cranberry,
May 7	41	Daniel Griffith,	Room Run, No. 1,
7	42	Joseph Renyick,	East Sugar Loaf,
16	43	John Stack,	East Sugar Loaf, No. 1,
16	44	Andrew Stack,	do. do.
16	45	Mathew Wylie,	do. do.
16	46	Anthony Deighton,	do. do.
16	47	John H. Welliver,	do. do.
30	48	John Baund,	Treskow,
30	49	Michael Jose,	Hazleton, No. 6,
July 2	50	Michael Moore,	Milnesville,
13	51	Michael Verisho,	Buck Mountain,
22	52	Fred Neyer,	Eckley, No. 5,
25	53	Evan Jenkins,	Panther Creek, No. 4,
29	54	William Nahler,	Sugar Loaf,
Aug. 4	55	James O'Hara,	Ebervale,

Luzerne and Carbon counties, Pennsylvania, with remarks on the cause of each, for December 31, 1881.

Remarks on Extent and Cause of Accident.	Explosion of CH_4 gas.	Falling of roof and coal.	By mine cars.	Premature blasts.	Miscellaneous, inside.	On surface.	Total.	Number of accident.
Was severely injured by being struck by a fragment of pulley that rolled down the slope, which fell from the hands of a pumpman,					1		1	1
Was struck on side of body by piece of coal and considerably bruised,		1					1	2
Severely injured by a fall of coal,		1					1	3
Was seriously hurt by an explosion of gas; he was driving an air-hole up the pitch, and went up with his safety-lamp to examine the place, while his laborer followed him with his naked lamp and fired the gas,	1						1	4
Had his thigh broken by mine car while walking up the run,			1				1	5
Both men were seriously injured by a fall of roof while making new plane in Wharton seam,		1					1	6
		1					1	7
These three men were on locomotive pushing a train of cars, one of which got off the track, throwing the engine off also, causing the boiler to leak, scalding and injuring the men,			1				1	8
			1				1	9
			1				1	10
Thigh bone fractured by falling from scaffold at Pea chute,						1	1	11
Arm broken and ankle sprained by falling off pulley belt, which was slipping,						1	1	12
Severely cut on head by falling a distance of 28 feet down slope,					1		1	13
Dangerously injured by blast blowing through pillar, miner in next chamber neglecting to give the usual warning,				1			1	14
Seriously injured by cars jumping off the track and squeezing him against props,			1				1	15
Had his arm fractured by falling a distance of eight feet at breaker,						1	1	16
Severely bruised by falling under truck on slope,			1				1	17
Leg fractured by a runaway car on slope, caused by mistake of top-man,			1				1	18
Leg fractured and badly cut otherwise by a fall of coal,		1					1	19
Arm dislocated by a fall of clod in the Wharton seam,		1					1	20
Dangerously injured by a fall of coal in his breast,		1					1	21
Collar bone broken and otherwise severely injured by falling under cars,			1				1	22
Crushed between car and prop on slope and badly bruised,			1				1	23
Eye seriously injured by being struck by a spike bar,					1		1	24
Collar bone fractured by being caught between car and door,			1				1	25
Leg fractured and otherwise injured by a fall of coal,		1					1	26
Severely cut on wrist by a fall of coal,		1					1	27
Leg fractured below knee by a fall of coal,		1					1	28
These three men were severely burnt by an explosion of fire-damp while clearing the gas from a chamber,	1						1	29
	1						1	30
	1						1	31
Severely injured by being blown from chute to gangway by same explosion,					1		1	32
Seriously injured by falling into an abandoned breast,					1		1	33
Squeezed between car and prop; not considered dangerous,			1				1	34
Leg fractured below knee and otherwise seriously injured by a fall of coal,		1					1	35
Severely injured by being caught between a car and a prop,			1				1	36
Seriously injured by a fall of top-coal,		1					1	37
Arm fractured and otherwise injured by being squeezed between car and prop on slope,			1				1	38
Leg fractured by a fall of coal,		1					1	39
Caught between cars at bottom of slope and severely injured,			1				1	40
Collar bone broken; caused by jumping on moving cars,			1				1	41
Seriously injured; caught between mine cars,			1				1	42
These five men were slightly burnt and otherwise injured by an explosion of fire-damp, gas being fired by an oversight of one of the burnt men,	1						1	43
	1						1	44
	1						1	45
	1						1	46
	1						1	47
Leg fractured by a piece of coal while putting a set of timber in place,		1					1	48
Severely injured by a fall of coal,		1					1	49
Hip dislocated by falling under cars in gangway,			1				1	50
Arm fractured and otherwise injured by falling in breaker,						1	1	51
Seriously injured by being knocked down by car while attempting to cross bottom of slope,			1				1	52
Arm fractured; slipped on turnout and cars passing over it,			1				1	53
Leg fractured below the knee by a steam-pipe he was moving falling on it,					1		1	54
Injured by a fall of top-coal on arm and hip,		1					1	55

TABLE No. 5.—

DATE.		Number of accidents.	NAMES OF PERSONS INJURED.	Names of Collieries.
Aug.	4	56	James Maloy,	Lattimer,
	10	57	Michael Rogers,	Hazleton No. 6,
	17	58	George Shattonick,	Hollywood,
	17	59	William Jackson,	Upper Lehigh No. 4,
Sept.	1	60	Manus Connahan,	Cross Creek No. 2,
	2	61	Patrick Rodgers,	Hazleton mine, inside slope,
	2	62	William McLoughlin,	Hazleton mine, inside slope,
	2	63	George Snyder,	Hazleton mine, inside slope,
	2	64	Patrick Bonner,	Hazleton mine, inside slope,
	5	65	John Bushrock,	Hollywood,
	6	66	William E. Davis,	Gowen,
	6	67	Hugh McManaman,	Highland No. 1,
	7	68	Hugh Gillespie,	Oak Dale No. 2,
	12	69	Patrick Fried,	Treskow,
	14	70	Richard Thomas,	Room Run No. 3,
	22	71	Andrew Brislin,	Cross Creek No. 1,
	29	72	John Bonner,	Cranberry,
Oct.	7	73	Vincent Mirusky,	Ebervale No. 5,
	12	74	Cornelius O'Donnell,	Eckley No. 5,
	15	75	Evan J. Williams,	Upper Lehigh No. 4,
	17	76	Philip Lewis, (fire boss,)	Panther Creek No. 4,
	17	77	John J. Davis,	Panther Creek No. 4,
	20	78	John O'Donnell,	Mount Pleasant,
	23	79	John Dudley,	Hazleton No. 3,
	24	80	John O'Donnell,	Cross Creek No. 1,
	26	81	Humphrey Eva,	East Sugar Loaf,
Nov.	5	82	Henry Polonia,	East Sugar Loaf,
	5	83	Thomas Gallagher,	Ebervale No. 2,
	6	84	John Bodner,	Upper Lehigh,
	12	85	Michael Verisky,	Buck Mountain,
	27	86	James McHugh,	Hanto Screen Building,
Dec.	2	87	Harry Ehler,	Lansford No. 5,
	5	88	Joseph Louseau,	Sandy Run,

Continued.

Remarks on Extent and Cause of Accidents.	Explosion of $C.H_4$ gas.	Falling of roof and slate.	By mine cars.	Premature blasts.	Miscellaneous inside.	On surface.	Total.	Number of accidents.
Seriously injured by being thrown under cars by a plank he was sitting on coming in contact with them,			1				1	56
Thigh dislocated and badly bruised on body by a fall of coal,		1					1	57
Fell into an old breast on surface, his lamp igniting his clothes, and seriously burned before he could be taken out,						1	1	58
Collar bone fractured by a fall of coal,		1					1	59
Had two of his ribs broken by a fall of coal,		1					1	60
These four men were driving a proving hole and starting a gangway at bottom of said slope, and were standing around the bottom; while a car was being hoisted, one of the main links broke, leaving the car back: the coal from which struck and seriously injured the men,			1				1	61
			1				1	62
			1				1	63
			1				1	64
			1				1	65
Seriously injured; being caught by a platform while riding to his work,			1				1	66
Dangerously injured by a car falling on him from trestling,			1				1	67
Arm fractured, and otherwise injured by a fall of coal,		1					1	68
Leg fractured while attempting to jump on passing cars,			1				1	69
Arm fractured in two places while attempting to jump on passing cars,			1				1	70
Severely injured by oiling machinery while in motion,						1	1	71
Seriously injured by mine cars, caused by misplaced switch,			1				1	72
Dangerously injured by a fall of coal,		1					1	73
Seriously injured by mine cars on the slope,			1				1	74
Seriously injured by a blast blowing through the pillar,				1			1	75
Leg fractured below knee by a piece of coal falling on it,		1					1	76
These two men were sent in on Sunday to clear some gas from breast No. 63, which they could not accomplish Saturday; one of the men lost his light, the other man opening his safety lamp, which exploded the gas, burning both lightly,	1						1	77
	1						1	
Collar bone fractured and bruised around body by a premature blast,				1			1	78
Seriously injured by being jammed between empty cars,			1				1	79
Leg fractured in two places by a piece of coal he was barring down,		1					1	80
Leg fractured below the knee by a fall of coal,		1					1	81
Severely cut on leg by a piece falling from the seven foot,		1					1	82
Received a severe scalp wound, and otherwise bruised; caused by a blast blowing through pillar,				1			1	83
Leg fractured in two places by being caught between a car and a prop,			1				1	84
Leg fractured by falling in chute in breaker,						1	1	85
Seriously injured by a car running over him near said breaker,						1	1	86
Slightly injured by being thrown under a car near breaker,						1	1	87
A French miner, was slightly injured by a premature blast. They say that the injured man had the match and squib put in place, but instead of lighting the match he lit the squib, with above result. This is another strong evidence against giving men places to mine coal before they know the danger thereof,				1			1	88
	11	25	32	5	6	9	88	

RECAPITULATION.

	1881.	1880.
Explosion of carbureted hydrogen gas,	11	1
Falls of coal and roof,	25	45
By mine cars,	32	15
Premature blasts,	4	3
Miscellaneous inside,	7	11
Miscellaneous outside,	9	18
	88	93

TABLE No. 6.—*Gives the total number of tons of coal mined in each colliery, number of days worked, ratio of coal mined per day, number of employés, ratio of coal mined per employé, number of persons killed and injured, ratio of coal per person killed and per person injured, ratio of persons employed per fatal and non-fatal accidents, number of kegs of powder used, number of tons mined per keg, &c., for the year 1881.*

PARDEE & CO.

NAMES OF COLLIERIES.	Total production of each colliery for the year 1881.	Number of days worked.	Ratio of coal mined per day.	Number of employees.	Ratio of coal mined per employee.	Number of fatal accidents.	Ratio of coal mined per fatal accident.	Number of non-fatal accidents.	Ratio of coal mined per non-fatal accident.	Ratio of persons employed per fatal accident.	Ratio of persons employed per non-fatal accident.	Number of kegs of powder used.	Ratio of coal mined per keg used.	Number of pounds of powder used.	Ratio of coal mined per pound in tons.
Hazleton mine,	77,059	205.5	374 98	185	416 54	1	77.059	4	19.265	185	46.25	1,028	74.96	25,700	2.99
Laurel Hill,	138,440	256	540.78	265	522.41	2	59,220	. . .	138 440	132 5	265	1,955	70.8	48,950	2.82
No. 3,	32,289	163	198 09	107	301 76	. . .	32,289	2	16,140	107	53.5	195	165.58	4,875	6 62
No. 6,	154,072	263.5	584.79	182	846 55	1	154,072	3	51,357	182	60.66	2,804	54.94	70,100	2.19
Cranberry,	124 153	240.5	516.22	226	549.35	2	62.076	4	31,038	113	56.5	2 648	46.88	66,200	1.87
East Crystal Ridge,	61,382	219.3	279.9	117	524 63	2	30,691	. . .	61 382	58.5	117	986	62 25	24,650	2.49
Sugar Loaf,	53 121	186.5	284 83	111	478.57	1	53,121	3	17.707	111	37	894	59.42	22,350	2.37
South Sugar Loaf,	45,916	200.4	229.12	119	385 85	. .	45,916	. . .	45,916	119	119	1,320	34.78	33,000	1.39
	686,432	. .	. . . . .	1,312	523.19	9	76,270	16	42 902	145.78	82	11,830	58.02	295 825	2.32

COXE BROTHERS & CO.

Cross Creek No. 1, Do. do. Do. do.	214,629	258 5	830.28	441	486.68	1	214,629	3	71,543	441	147	5,180	41.43	129,500	1.65
Do. No. 2, Do. do. Do. do.	266,734	256.7	1,039.08	452	590.11	1	266 734	2	133,367	452	226	4,484	59.48	112,000	2.38
Do. No. 3, Do. do.	15,891	105	151.34	71	223.82	.	15,891	1	15,891	71	71	311	51.09	7,775	2.04
West Cross Creek No. 1, Do. do.	37,510	87	431.15	207	181.21	3	12,503	2	18,755	69	103.5	923	40.64	23,075	1.62
	534,764	. . . .	. . . .	1,171	456.66	5	106,952	8	66 845	292.75	146.37	10,898	49.07	272 450	1.96

LEHIGH COAL AND NAVIGATION COMPANY.

No. 3,	136,150	249.6	455 47	339	401 62	2	68,070	6	22,691	169.5	56 5	1,184	114.99	29,600	4 59
No. 4,	54 324	118	460.37	323	168.18	3	18 108	2	27,162	107.66	161 5	420	129.34	10,500	5.17
No. 5,	73.240	224	326.94	304	240.92		73 240	4	18,060	304	76	840	87.19	21,000	3.48
No. 6,	91 551	234	391.24	295	310.34		91,551	1	91,551	295	295	600	152 58	15,000	6.1
No. 9,	59,133	122	484 69	416	142 14	1	59,133	2	29 566	416	208	420	140.79	10,500	5.63
	414,398	.		1,677	247.1	6	65,066	15	27,626	279.5	111,8	3,464	119 62	86,600	4.78

JEDDO.–G. B. MARKLE & CO.

Oak Dale No. 1,	111,433	226	493.06	212	525.62	2	55 716	1	111,433	106	212	2,228	50.15	55.700	2
Oak Dale No. 2,	104.512	225.5	464.49	190	550.06	1	104.512	1	104,512	190	190	1,751	59 68	43,775	2 38
Highland No. 1,	99.009	203	487.72	207	478.26	1	99.009	1	99.009	207	207	2.287	43 29	57.175	1.73
Highland No. 2,	98,866	218	453 51	194	453 42	1	98,866	1	98,866	194	194	2,194	45.05	54,850	1.8
	413,820	. .	. .	803	515.34	5	82,764	4	103,455	160.6	200.75	8,460	48.91	211,500	1.95

UPPER LEHIGH COAL COMPANY.

Nos. 1, 2, and 3,	217,969	232	932 26	270	807 07		217,969	3	72,636	270	90	3,020	72.15	75,500	2.88
No. 4,	169,833	239	710 59	213	797.33	1	169,833	3	56,611	213	71	3,320	51.15	83,000	2.04
	387,742	.	. .	483	802.77	1	387,712	6	64,623	483	80.5	6,340	61.15	158,500	2.44

LATTIMER.–PARDEE BROTHERS & CO.

No. 1,	124,755	227	549 58	166	751 53	.	124 755	1	124 755	166	166	1.500	83 17	37,500	3 32
No. 2,	129,999	241	539.41	224	580 35		129,999	1	129.999	224	224	1.633	79 6	40,825	3.18
	254 754	.		390	653.21	.	254.754	2	127,377	390	195	3,133	81 31	78,325	3.25

COUNCIL RIDGE.–J. LEISENRING & CO.

No. 2,	155,572	247	629 81	238	653 65	.	155,572	1	155,572	238	238	3,001	51 84	75,025	2.07
No. 5,	98,979	242	409	161	603.53	2	49,489	3	32,993	82	54.66	2,415	40.98	60,375	1.63
	254,551	. .	. .	402	633.21	2	127,275	4	63 637	201	100.5	5 416	46 99	135,400	1.87

TABLE No. 6—*Continued.*

EAST SUGAR LOAF.—LINDERMAN, SKEER & CO.

NAMES OF THE COLLIERIES.	Total production of each colliery for the year 1881.	Number of days worked.	Ratio of coal mined per day.	Number of employees.	Ratio of coal mined per employee.	Number of fatal accidents.	Ratio of coal mined per fatal accident.	Number of non-fatal accidents.	Ratio of coal mined per non-fatal accident.	Ratio of persons employed per fatal accident.	Ratio of persons employed per non-fatal accident.	Number of kegs of powder used.	Ratio of coal mined per keg used.	Number of pounds of powder used.	Ratio of coal mined per pound in tons.
No. 2,	37,499	175.5	213 32	125	299 99	.	37.499	2	18.749	125	62.5	372	100.8	9,300	4.03
No. 3,	89,583	230.3	388.98	147	609.04	2	44 791	3	29,861	73.5	49	1,647	54 39	41,175	2 17
Nos. 1, 4, and 5,	102 413	245.3	417.05	307	333 59	1	102,413	5	20,482	307	61.4	1,065	96.16	26,625	3.84
	229,495	.	. . .	579	396.36	3	76,498	10	22,949	193	57.9	3,084	74.41	77,100	2.97
SPRING MOUNTAIN—J. C. HAYDON & CO.															
No. 1,	102 075	235	434.36	207	493.11	. .	102.075	1	102.075	207	207	2,198	46.44	54,950	1 85
No. 5 and drift,	113,025	240	470.93	237	476.89	1	113.025	. .	113.025	237	237	2,602	43.44	65,050	1.73
	215,100	.	. . .	444	484 45	1	215,100	1	215,100	444	444	4,800	44.81	120,000	1 79
EBERVALE COAL COMPANY.															
Nos. 1 and 2,	122.266	194.5	628.61	260	470 25	2	61,133	3	40,755	130	86.6	1,582	77.28	39,550	3.09
Nos. 3, 5, and 6,	76,559	152.7	501 36	154	497.14	. .	76,559	2	38,279	154	77	944	81.10	23,600	3.24
	198,825			414	480 25	2	99,412	5	39,765	207	82.8	2,526	78 71	63,150	3.14
STOUT COAL COMPANY, MILNESVILLE.															
No. 5,	87 381	227	384 93	185	472 33	1	87,381	1	87 381	185	185	814	107 34	20,350	4.29
No. 7,	55,024	219	251 25	103	534.21		55,024	1	55,024	103	103	585	94.05	14,625	3.76
	142,405	.	. . .	288	503.19	1	142,405	2	71,202	288	144	1 399	101.07	34,975	4.07

SPRING BROOK.—G. H. MYERS & CO.

No. 5,	83,685	239	350.14	188	445.13	1	83 685	1	83,685	188	188	1,414	59 18	35,350	2.36
No. 6,	94,994	244	389.31	198	479.26	1	94,994		94,994	198	198	1,669	56.91	41,725	2.27
	178,679			386	462.89	2	89,339	1	178 679	193	386	3,083	57.95	77,075	2.31

MISCELLANEOUS COMPANIES.

Mount Pleasant,	146 691	230.4	636 37	375	391.17	3	48,897	2	73,334	125	187.5	3,095	47.08	77,375	1 89
Coleraine,	138,187	269.7	512.47	316	437.3		138 187	1	138.187	316	316	3,360	41.12	84 000	1.62
Sandy Run,	136 085	209.5	649.57	290	469.25	1	136,085	1	136,085	290	290	2 520	50.8	63 750	2.13
Hollywood,	125,141	233.2	536 62	283	442 19	2	62,570	2	62.570	141.5	141.5	1,500	83 43	37 500	3 33
Buck Mountain,	120,719	188	642.12	368	328.04		120,719	2	60.359	368	184	3,929	30.75	98 225	1.22
Tresckow,	116,561	203.1	573. 9	304	383 42	2	58,280	3	38 853	152	101.3	2.461	47.36	61,525	1 89
Beaver Brook,	98.028	230	426. 2	160	612 67		98,028	1	98,028	160	160	901	109	22 525	4.35
Humboldt,	96.240	241.3	398.84	144	668.33	1	96,240	1	96 240	144	144	1,936	49.71	48.400	1 98
Harleigh,	94,755	226.5	418.34	217	436.65	1	94.755	1	94 755	217	217	2 422	39.12	60 550	1 56
Black Ridge,	21,754	159	136 69	149	146		21 754		21.754	149	149	1.147	19	28 675	.75
Pond Creek,	32,822			112	293.05		32 822		32,822	112	112	1,213	27 05	30 325	1 08
	1,126,983			2,719	414.63	10	112 698	14	80,491	271 8	197	24,484	46.02	612 100	1 84

RECAPITULATION.

Ario Pardee & Co.,	686.432			1 312	523 19	9	76,270	16	42 902	145 78	82	11 830	58.02	295.825	2 32
Coxe Brothers & Co.,	534,764			1,171	456.66	5	106,952	8	66,845	292.75	146.37	10 898	49.07	272 450	1.96
Lehigh Coal and Navigation Company,	414 398			1,677	247.10	6	69.066	15	27,626	279 5	111 8	3,464	119.62	86.600	4.78
G. B. Markle & Co.,	413,820			803	515.34	5	82.764	4	103,455	160 6	200 75	8 460	48.91	211 500	1.95
Upper Lehigh Coal Company,	387,742			515	752.89	1	387 742	6	64 623	515	85.33	6 340	61.15	158.500	2.44
Lattimer—Pardee Brothers & Co.,	254,754			390	653.21		251 754	2	127,377	390	195	3,133	81.31	78,325	3 25
Council Ridge—J. Leisenring & Co.,	254 551			402	633 21	2	127 275	4	63 637	201	100 5	5 416	46 99	135.400	1.87
East Sugar Loaf—Linderman, Skeer & Co.,	229.495			579	396 36	3	76 498	10	22 949	193	57.9	3 084	74 41	77.100	2 97
Spring Mountain—J. C. Haydon & Co.,	215 100			444	484 15	1	215 100	1	215 100	444	444	4 860	44 84	120,100	1.79
Ebervale Coal Company,	198 825			411	480.25	2	99,412	5	39.765	207	82.8	2 526	78 71	63 150	3.14
Stout Coal Company,	142.405			288	503.19	1	142.405	2	71.202	288	144	1,399	101.07	34 975	4 07
Spring Brook—G. H. Myers & Co.,	178,679			386	462.89	2	89,339	1	178.679	193	386	3,083	57 95	77.075	2 31
Miscellaneous coal companies,	1 126,983			2.719	414.63	10	112,698	14	80,491	271.8	197	24 484	46.02	612,100	1.84
	5 037,948			11,100	453.87	47	107.190	88	57,249	236 17	126.13	88 917	56.65	2 222,925	2.26

TABLE No. 7.—*Number of each class of employés at each colliery during the year 1881.*

ARIO PARDEE & CO.

Names of Colliery.	Number of employees inside.									Number of employees outside.										Grand total inside and outside.
	Bosses.	Engineers and pumpmen.	Miners.	Miners' laborers.	Other company men.	Drivers	Runners.	Door boys and oilers.	Total inside.	Bosses.	Clerks and book-keepers.	Engineers and firemen.	Pumpmen.	Smiths and carpenters.	Other mechanics.	Head and plate men.	All other breaker men.	Drivers and runners.	Slate pickers.	Total outside.	
1. Hazleton mine,	1	12	49	22	16	10	1	6	107	3	.	7	12	4	. .	11	13	4	34	78	185
2. Laurel Hill,	3	12	65	50	10	18	2	5	155	3	. .	8	6	6	. 3	8	23	4	49	110	265
3. No. 3,	1	.	39	10	2	3	. .	12	57	12	.	6	4	4	. . .	6	11		17	50	107
4. No. 6,	1	.	85	17	4	6	2	3	118	3	.	3		3		8	16	1	40	64	182
5. Cranberry,	1	.	92	39	7	13	2	7	161	3		4	2	4		6	13	1	32	65	226
6. East Crystal Ridge,	1	.	36	15	3	4	1	2	62	12	.	9	12	3		6	8	4	21	55	117
7. Sugar Loaf,	1	.	18	18	16	5	. .	3	61	12		2	5	4	4	6	7	12	18	50	111
8. South Sugar Loaf,	1	. . .	57	8	4	4	2	3	79	12		4	1	3	. . .	5	6	1	18	40	119
	10	4	441	179	62	63	10	31	800	20		43	22	31	7	56	87	17	229	512	1 312

COXE BROTHERS & CO.

11. Cross Creek Nos. 1, 1, 1,	1	8	94	92	36	22	13	10	276	3	7	5	3	9	3	7	29	13	86	165	441
14. Cross Creek Nos. 2, 2, 2,	2	4	90	92	61	19	19	19	306	12	. .	7		12	12	6	17	9	91	146	452
16. Cross Creek Nos 3, 3,	1	. . .	16	3	19	3		4	46	1	. .	3	. . .	1	12	1	1	1	15	25	71
18. West Cross Creek Nos. 1, 1,	1		36	20	43	10	8	8	126	12	1	5	.	19	12	5	5	5	37	81	207
	5	12	236	207	159	54	40	41	754	8	8	20	3	41	9	19	52	28	229	417	1,171

LEHIGH COAL AND NAVIGATION COMPANY.

19. Room Run, No. 1,																					
20. Room Run, No. 2,	3	6	68	52	14	18	. .	14	175	1	. .	12	1	7	1	9	34	11	85	164	339
21. Room Run, No. 3,																					
22. Panther Creek, No. 4,	1	5	71	34	30	12	. .	14	167	1	. .	7	. .	3	. .	1	37	8	74	131	298

23. Panther Creek, No. 5,	1	5	68	26	45	18	. . .	17	180	1	. . .	6	.	2	.	1	39	7	42	98	278
24. Panther Creek Tunnel,																					
25. Panther Creek, No. 6,	2	2	86	22	27	11	. . .	3	153	1	. . .	6	. .	4	.	2	31	10	62	116	269
26. Panther Creek Tunnel,																					
27. Panther Creek, No. 9,	2	2	89	69	33	18	. . .	16	220	1	. .	7	. .	6	.	2	42	10	100	168	388
28. Panther Creek, No 9,										1	. . .	4		2	2	15	45	2	36	105	105
Screen building,	. . .	. .	.		. . .	.	. . .	.													
	9	20	382	194	149	77	. .	64	895	6	. .	42	1	24	3	30	226	48	402	782	1 677

JEDDO.—G. B. MARKLE & CO.

29. Oak Dale, No. 1,	1	3	90	11	7	17		7	136	1	1	5		3		7	19	3	37	76	212
30. Oak Dale, No. 2,	1	2	76	12	8	19	. . .	4	122	1	1	3	. .	3	.	6	17	3	34	68	190
31. Highland, No. 1,	1	5	80	15	8	15		4	128	1	1	3	.	3		7	18	3	43	79	207
32. Highland, No. 2,	1	3	71	18	3	12	.	1	109	1	1	3		3	.	9	13	3	52	85	194
	4	13	317	56	26	63	. .	16	485	4	4	14	. .	12		29	67	12	166	303	803

EAST SUGAR LOAF.

33. East Sugar Loaf, No. 1,	1	4	27	25	3	5	1	. . .	66	2	2	. .	. . .	15	18	1	14	6	.	58	124
34. East Sugar Loaf, No. 2,	1	3	21	11	16	7	5	1	68	1	. . .	6	. .	4	. .	7	18	1	20	57	125
35. East Sugar Loaf, No. 3,	1	3	45	26	4	13	3	6	101	1	. . .	4	. .	4	. .	9	9	3	16	46	147
36. East Sugar Loaf, No. 4,	1	5	23	10	3	6	1	1	50	.			. . .	. . .	. .	. . .	.	. .			50
37. East Sugar Loaf, No. 5,	. . .	1	21	13	9	6		2	52	1		4	. .	6		14	20	3	33	81	133
	4	16	137	85	35	37	10	10	337	5	2	14	.	29	18	31	61	13	69	242	579

UPPER LEHIGH COAL CO.

38. Upper Lehigh, No. 1,	1	3	61	55	7	18	7	13	165	1	7	7	2	10	6	12	8	9	43	105	270
39. Upper Lehigh, No. 2,																					
40. Upper Lehigh, No. 4,	1	1	52	55	6	9	. . .	7	131	1	. . .	6	1	2	1	10	4	9	48	82	213
41. Upper Lehigh, No. 5,	1	2	3	6	. . .	.	. . .	. .	12	. .	. . .	3	. .	. . .	. .	2	. . .			5	17
42. Upper Lehigh, No. 6,	1	2	3	6	. .	.	. .	.	12			2		.		1	. . .			3	15
	4	8	119	122	13	27	7	20	320	2	7	18	3	12	7	25	12	18	91	195	515

TABLE No. 7—*Continued.*

SPRING MOUNTAIN.—J. C. HAYDON & CO.

NAMES OF COLLIERIES.	NUMBER OF EMPLOYEES INSIDE									NUMBER OF EMPLOYEES OUTSIDE.											Grand total inside and outside.
	Bosses.	Engineers and pumpmen.	Miners.	Miners' laborers.	Other company men.	Drivers.	Runners.	Door boys and oilers.	Total inside.	Bosses.	Clerks and book-keepers.	Engineers and firemen.	Pumpmen	Smiths and carpenters	Other mechanics.	Head and plate men.	All other breaker men.	Drivers and runners.	Slate pickers.	Total outside.	
43. Spring Mountain, No. 1,	1	2	45	35	5	21	4	4	117	4	1	7	1	3	4	8	12	2	46	88	205
44. Spring Mountain, No. 5,	2	2	52	31	3	26	3	4	123	3	1	8	2	3	1	6	10	3	42	79	202
45. Spring Mountain drift,																					
46. Spring Mountain, No. 4,	1	1	11		2	3		2	23	1	1	7	1	2	2					14	37
47. Spring Mountain, No. 5,																					
	4	5	111	66	10	50	7	10	263	8	3	22	4	8	7	14	22	5	88	181	444

EBERVALE COAL COMPANY.

48. Ebervale, No. 1,		4	41	6	3	9	3	1	67	1	5	5		2	3	3	1			20	87
49. Ebervale, No. 2,	1	1	50	22	8	12	3	3	100	1		6		4	4	6	8	4	40	73	173
50. Ebervale, No. 3,	1	2	4	12				2	11	1		5		4	2	8	5	7	32	64	75
51. Ebervale, No. 5,			26	12	1	3	1		33												33
52. Ebervale, No. 6,			40		1	4	1		46												46
	2	7	161	32	13	28	8	6	257	3	5	16		10	9	17	14	11	72	157	414

COUNCIL RIDGE.—J. LEISENRING & CO.

53. Council Ridge, No. 2,	1	6	76	38	6	7	4	7	145	1	4	8	4	8		4	20	4	40	93	238
54. Council Ridge, No. 5,	1	4	55	28	4	4	2	4	102	1		4	2	4		4	12	2	33	62	164
	2	10	131	66	10	11	6	11	247	2	4	12	6	12		8	32	6	73	155	402

LATTIMER.—PARDEE BROTHERS & CO.

55. Lattimer, No. 1,	1	2	28	9	10	8	1	4	63	3	..	3	...	4	..	6	4	9	74	103	166
56. Lattimer, No. 2,	1	3	76	13	12	7	3	4	119	2		3		4	.	9	7	8	72	105	224
	2	5	104	22	22	15	4	8	182	5	.	6	..	8	.	15	11	17	146	208	390

SPRING BROOK.—G. H. MYERS & CO.

57. Yorktown, No. 5,	1	2	34	30	25	9	1	3	105	1	1	6	2	6	..	5	13	2	32	68	173
58. Yorktown, No. 6,	1	2	36	27	11	10		2	89	1	1	6		5	1	5	10	4	34	67	156
59. Dutchtown, No. 7,		2	5	..	9	6	1		23	1	..	4		3	.	..	24	...	2	34	57
	2	6	75	57	45	25	2	5	217	3	2	16	2	14	1	10	47	6	68	169	386

MILNESVILLE.—STOUT COAL COMPANY.

60. Milnesville, No. 5,	...	1	13	9	2	2	2	1	30	1	...	7	...	5	...	2	27	2	30	73	103
61. Milnesville, No. 7,	1	2	31	17	21	10	4	3	89	1	1	8		5	..	4	33	2	41	96	185
	1	3	44	26	25	12	6	4	119	2	1	15	..	10	..	6	60	4	71	169	288

MISCELLANEOUS COMPANIES.

Mount Pleasant, Nos. 1, 2, 3, and 5,	2	...	96	54	14	23	6	7	202	2	1	15	2	11	1	15	55	6	65	173	375
Buck Mountain, Nos. 1, 3, 4, and 7,	5	5	123	40	29	19	4	7	232	2	2	13	4	13	1	14	23	21	43	136	368
Coleraine, Nos. 1 and 2,	2	6	66	62	17	16	6	6	181	2	5	14	1	20	1	15	5	14	69	136	317
Treskow, Nos. 6 and 7,	2	2	78	48	20	22	5	6	183	1	1	10		8	...	8	40	2	51	121	304
Sandy Run, Nos. 1 and 2,	1	3	71	72	13	13	...	9	182	1	5	5	1	5	10	10	22	4	45	108	290
Hollywood, Nos. 1 and 2,	1	...	30	15	31	10	2	2	91	3	2	8	1	10	6	9	76	6	71	192	283
Harleigh, Nos 1 and 4,	1	3	57	48	7	10	..	4	130	1	1	6	..	5	...	6	19	6	43	87	217
Beaver Brook, Nos. 1 and 2,	1	3	27	39	2	9		5	86	1	3	12	...	4	3	5	12	4	30	74	160
Black Ridge,	1	2	40	17	6	5	2	4	77	1	1	3	.	3	1	6	12	2	43	72	149
Humboldt,	1	1	27	27	8	10		1	75	2	3	8	1	2	3	9	6	7	28	69	144
Pond Creek,									62											50	112
	17	25	645	442	151	143	27	51	1,501	16	24	94	10	71	31	101	275	82	513	1,218	2,719

TABLE No. 7—*Continued.*

RECAPITULATION.

	NUMBER OF EMPLOYEES INSIDE									NUMBER OF EMPLOYEES OUTSIDE										Grand total inside and outside.
	Bosses.	Engineers and pumpmen.	Miners.	Miners' laborers.	Other company men.	Drivers.	Runners.	Door boys and oilers.	Total inside.	Bosses.	Clerks and book-keepers	Engineers and firemen.	Pumpmen.	Smiths and carpenters	Other mechanics.	Head and plate men.	All other breaker men.	Drivers and runners.	Slate pickers	Total outside.	
A. Pardee & Co.,	10	4	441	179	62	63	10	31	800	20		43	22	31	7	56	87	17	229	512	1,324
Coxe Brothers & Co.,	5	12	236	207	159	54	40	41	754	8	8	20	3	41	9	19	52	28	129	417	1,171
Lehigh Coal and Navigation Company,	9	20	382	194	149	77		64	895	6		42	1	24	3	30	226	48	402	782	1 677
G. B. Markle & Co.,	4	13	317	56	26	63		16	495	4	4	14		12		29	67	12	166	308	803
East Sugar Loaf,	4	16	137	88	35	37	10	10	337	5	2	14		29	18	31	61	13	69	242	579
Upper Lehigh Coal Company,	4	8	119	122	13	27	7	20	320	2	7	18	3	12	7	25	12	18	91	195	515
Spring Mountain—J. C. Haydon & Co.,	4	5	111	66	10	50	7	10	263	8	3	32	4	8	7	14	22	5	88	181	444
Ebervale Coal Company,	2	7	161	32	13	28	8	6	257	3	5	16		10	9	17	14	11	72	157	414
Council Ridge Coal Company,	2	10	131	66	10	11	6	11	247	2	4	12	6	12		8	32	6	73	155	402
Lattimer—Pardee Brothers & Co.,	2	5	104	22	22	15	4	8	182	5		6		8		15	11	17	146	208	390
Spring Brook—G. H. Myers & Co.,	2	6	75	57	45	25	2	5	217	3	2	16	2	14	1	10	47	6	68	169	386
Milnesville—Stout Coal Company,	1	3	44	26	23	12	6	4	119	2	1	15		10		6	60	4	71	169	288
Miscellaneous companies,	17	25	645	442	151	143	27	51	1 501	16	24	94	10	71	31	101	275	82	513	1 218	2 719
	66	134	2 903	1,557	718	605	127	277	6.387	84	60	332	51	282	92	362	966	267	2 217	4 713	11,100
Men not engaged at mining at present,																					286
																					11 386

TABLE No. 8.—Giving the names of Collieries, location of Collieries, names of Landowners, Operators, and names of Officers in the South District of Luzerne and Carbon counties, for 1881.

NAMES OF COLLIERIES.	Location of Collieries.	Names of Landowners.	Names of Operators.	Names of General Superintendents.
Hazleton Mine,	Hazleton,	Lehigh Valley Railroad Company,	Arlo Pardee & Co.,	Calvin Pardee.
Laurel Hill,	do.	do. do.	do.	do.
No. 3,	do.	do. do.	do.	do.
No. 6,	do.	do. do.	do.	do.
Cranberry,	do.	Heirs of A. S. & E. Roberts,	do.	do.
East Crystal Ridge,	do.	Diamond Land Coal Company,	do	do.
Sugar Loaf,	do.	do. do.	do.	do.
South Sugar Loaf,	do.	Diamond Land and L. V. R. R. Co.,	do.	do.
East Sugar Loaf, No. 1 and 5,	Stockton,	Smith estate,	Linderman, Skeer & Co.,	William Airey.
East Sugar Loaf, No. 3 and 4,	do.	Smith & Coxe estate,	do.	do.
No. 2,	do.	Smith estate,	do.	do.
Pond Creek,			Pond Creek Coal Co.	
Upper Lehigh No. 2,	U. Lehigh, Luzerne co.,	Nescopec Coal Company,	Upper Lehigh Coal Co.,	Daniel Bertsch.
Upper Lehigh No. 4,	do. do.	Estate Charles S. Coxe,	do.	do.
Upper Lehigh No. 5,	do. do.	Nescopec Coal Company,	do.	do.
Upper Lehigh No. 6,	do. do.	do. do.	do.	do
Sandy Run,	Sandy Run, Luzerne co.,	W. Jenks Fell, trustee,	M. S. Kemerer & Co.,	Thomas M. Righter.
Highland No. 1,	Jeddo, Luzerne county,	Highland Coal Company,	G. B. Markle & Co,	John Markle.
Highland No. 2,	do. do.	do. do.	do.	do.
Oak Dale No. 1,	do. do.	Union Improvement Company,	do.	do.
Oak Dale No. 2,	do. do.	do. do.	do.	do.
Buck Mountain Nos. 1, 4, 7,	Buck Mountain, Carbon co.,	Buck Mountain Coal Company,	Buck Mountain Coal Co.,	William Spencer.
Council Ridge No. 2,	Eckley, Luzerne county,	Estate Charles S. Coxe,	J. Leisenring & Co.,	J. S. Wentz.
Council Ridge No. 5,	do. do.	do. do.	do.	do.
Cross Creek No. 1,	Drifton, Luzerne county,	Estate Tench Coxe,	Coxe Bros. & Co.,	Arthur McClellan.
Cross Creek No. 2,	do. do.	do	do.	do.
Cross Creek No. 3,	do. do.	Jeddo Coal Company,	do.	do.
West Cross Creek,	Gowen, Luzerne county,	West Black Creek Coal Company,	do.	do.
Lower Cross Creek,	Derringer, Luzerne co.,	Estate of Tench Coxe & Henry Derringer,	do.	do.
Middle Cross Creek,	Tomhicken, Luzerne co.,	do. do.	do.	do.
Ebervale Nos. 1 and 2,	Ebervale, Luzerne co.,	Union Improvement Company,	Ebervale Coal Company,	T. D. Jones.
Ebervale Nos. 3, 5, and 6,	do. do.	do. do.	do.	do.
Black Ridge,	Heimville, Luzerne co.,	Smith Spencer & Graham,	Black Ridge Coal Co.,	N. Bartholomew.
Coleraine No. 1,	Beaver Meadow,	W. T. Carter,	William T. Carter & Co.,	John Martin, senior.
Coleraine No. 2,	do.	do.	do.	do.
Spring Mountain No. 1,	Jeansville,	Spring Mountain Coal Company,	J. C. Haydon & Co.,	J. C. Haydon.
Spring Mountain No. 4,	do.	do. do.	do.	do.
Spring Mountain No. 5,	do.	do. do.	do.	do.
Drift No. 5,	do.	do. do.	do.	do.
Treskow No. 2,	Treskow, Pa.,	Lehigh and Wilkes-Barre Coal Company,	E. B. Leisenring,	E. B. Leisenring.
Yorktown No. 5,	Yorktown, Carbon co.,	New York and Lehigh Coal Company,	George H. Myers & Co.,	George John.

TABLE No. 8—*Continued*

NAMES OF COLLERIES.	Location of Collieries.	Names of Landowners.	Names of Operators.	Names of General Superintendents.
Yorktown No. 6,	Yorktown, Carbon co.,	New York and Lehigh Coal Company,	George H. Myers & Co.,	George John.
Beaver Brook,	Luzerne county,	C. Tower and others,	C. M. Dodson & Co.,	E. L. Bullock.
Mount Pleasant Nos. 1, 2, 3, 5,	Luzerne county, Pa.,	Estate Charles S. Koons and others,	Pardee Sons & Co.,	Calvin Pardee.
Hollywood Nos. 1 and 2,	Hazel twp., Luzerne co.,	Big Black Creek Improvement Company,	Calvin Pardee & Co.,	Calvin Pardee.
Lattimer No. 1,	do. do.	do. do.	Pardee Bros. & Co.,	M. M. Cooper.
Lattimer No. 2,	do. do.	do. do.	do.	do.
Milnesville No. 6,	Milnesville, Luzerne co.,	Porter estate,	Stout Coal Company,	Charles Kerbaugh.
Milnesville No. 7,	do. do.	do.	do.	do.
Harleigh Nos. 1 and 4,	Harleigh, Luzerne county,	Big Black Creek Improvement Company,	McNair & Co.,	T. S. McNair.
Humboldt,	Humboldt,	Lehigh Valley Railroad Company,	Linderman, Skeer & Co.,	William Airey.
Room Run No. 1,	Nesquehoning, Carbon co.	Lehigh Coal and Navigation Company,	Lehigh Coal and Nav. Co.,	W. D. Zehner.
Room Run No. 2,	do.	do. do.	do. do.	do.
Room Run No. 3,	do.	do. do.	do. do.	do.
Panther Creek No. 4,	Mauch Ch'k tp. Carbon co.	do. do.	do. do.	do.
Panther Creek No. 5,	do.	do. do.	do. do.	do.
Panther Creek No. 6,	do.	do. do.	do. do.	do.
Panther Creek No. 9,	Lansford,	do. do.	do. do.	do.

TABLE No. 8—*Continued.*

NAMES OF COLLERIES.	Names of Assistant Superintendents.	Names of General Inside Foremen.	Names of Mine Bosses.	Names of General Outside Foremen.	Names of Outside Foremen.
Hazleton Mine,	Frank Pardee.	Thomas Dickinson,	Peter Watson,	S. D. Taylor,	Leroy Gavitt.
			George Kirschner,		
Laurel Hill,	do.	do.	James Durkin,	do.	Jacob Pipert.
			Joseph Nixon,		
No. 3,	do.	do.	Henry Youngport,	do.	Adam Shermer.
No. 6,	do.	do.	August Yager,	do.	John Jacobs.
Cranberry,	do.	do.	Conrad Miller,	do.	William Gerbach.
East Crystal Ridge,	do.	do.	John Thurlby,	do.	John Berner.
Sugar Loaf,	do.	do.	John Ferry,	do.	Herman Minich.
South Sugar Loaf,	do.	do.	William Fatkin,	do.	Herman Richart.
East Sugar Loaf Nos. 1 and 5,	R. E. Carter,	John Airey,	Josiah Jenkins,	John Turner,	John Harvey.
East Sugar Loaf Nos. 3 and 4,	do.	do.	John Gundry,	do.	Joseph Ford.
No. 2,	do.	do.	William Shaw,	do.	Samuel R. Yost.
Upper Lehigh No. 2,	Charles W. Colvin,	William Powell,	William Powell, junior,		John Hinkle.
Upper Lehigh No. 4,	do.	do.	do.		James Jameson.
Upper Lehigh No. 5,	do.	do.	Thomas Sheppard,		
Upper Lehigh No. 6,	do.	do.	James N. Jones,		
Sandy Run,	Walter Leisenring,		Thomas Charlton,	John Lieb.	
Highland No. 1,	Aloan Markle,	James C. Howell,	Samuel Dunkeley,	Michael Stafford,	Robert Cowan.
Highland No. 2,	do.	do.	George Browell,	do.	G. G. Schollenberger.
Oak Dale No. 1,	do.	do.	Joel T. Stevens,	Charles Goersch,	J. W. Hensinger.
Oak Dale No. 2,	do.	do.	James Cartright,	do.	Hugh McNelis.
Buck Mountain Nos. 1, 4, 7,		Thomas J. Edwards,	Thomas J. Edwards,	James McKinley.	
Council Ridge No. 2,			James Long,	George Rickert,	Henry Held.
Council Ridge No. 5,			Peter Pitt,	do.	J. Ziegler.
Cross Creek No. 1,	Edgar Kudlich,	Benjamin Gibbon,	William Powell,		George Davis.
Cross Creek No. 2,	Mining Department,	do.	Wm. Marley & D. James,		J. Ziegler.
Cross Creek No. 3,	Lafayette Lavan,	do.	Evan Thomas,		Lewis Steinberly.
West Cross Creek,	Preparation Departm't,	do.	Evan Watkin,		Levi Hartranft.
Lower Cross Creek,	John Wagner,	do.	Thomas Howell,		
Middle Cross Creek,	Outside Department,	do.	do.		
Ebervale Nos. 1 and 2,	G. H. Gardner,	Jacob Schumaker,	Jacob Schumaker,	G. H. Gardner,	Ab. Minich.
Ebervale Nos. 3, 5, and 6,	do.	George Nesbitt,	George Nesbitt,	do.	N. E. Boyle.
Black Ridge,			William E. Evans,		Charles Hutz.
Coleraine No. 1,			William Dunn,		Samuel Wear.
Coleraine No. 2,			William Davis,		William McCoy.
Spring Mountain No. 1,		Stewart Macfarlane,	Owen Williams,	Joseph Shelhammer.	
Spring Mountain No. 4,		do.	David Macfarlane,	do.	
Spring Mountain No. 5,		do.	William Morris,	do.	
Drift No. 5,		do.	Samuel Williams,	do.	
Tresckow No. 2,		Owen R. Evans,	Owen R. Evans,	George Spencer,	George Spencer.
Yorktown No. 5,			Evan Rees,		John S. Boyer.
Yorktown No. 6,			William T. Williams,		George Martin.

TABLE No. 8—*Continued.*

Names of Collieries.	Names of Assistant Superintendents.	Names of General Inside Foremen.	Names of Mine Bosses.	Names of General Outside Foremen.	Names of Outside Foremen.
Beaver Brook,		Daniel J. Thomas,	D. J. Thomas,	Rob. G. Russel.	
Mount Pleasant Nos. 1, 2, 3, 5,		Robert Fishburn,	George Fishburn,	Thomas W. Howells.	
Hollywood Nos. 1, 2,		Ebenezer Evans,		John S. Jacobs.	
Lathmer No. 1,		William Martin,	W. Martin,		N. Drumar.
Latimer No. 2,		do.	R. Fagan,		John Reich.
Milnesville No. 6,			Paul Winters,		William Andreas.
Milnesville No. 7,			do.		John A. Mason.
Harleigh Nos. 1 and 4,		Andrew Lee,	A. Lee,		George Hinkle.
Humboldt,		William James,			Henry Rough.
Room Run No. 1,	Richard Eustice,	Richard Eustice,	Hugo Ronamus,	Richard Eustice,	Moses Neyer.
Room Run No. 2,	do.	do.	Benjamin Hamond,		
Room Run No. 3,	do.	do.	William Smitham,		
Panther Creek No. 4,		William H. Evans,	Thomas Whildin,		Samuel Nevins.
Panther Creek No. 5,		do.	John Bogle,		William W. Ratcliff.
Panther Creek No. 6,		do.	William Pritchard,		Daniel McMichael.
Panther Creek No. 9,		do.	George W. Holvey,		William W. Griffith.

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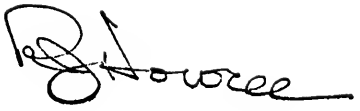
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